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MARS HILL

– Background Report and Recommendations for Land Use Resource Use

Abstract

Mars Sand Hills or Mars Hill is a significant natural resource area that is currently identified for its outdoor recreational and mineral resource extraction. Since 1982, this Crown Land area has been identified and coded for recreational use. Nevertheless, it has been requested for some additional land uses that are very intensive in nature and contrary to the coding. Simultaneously, Manitoba Natural Resources, Wildlife Branch has expressed a concern and interest in Mars Hill's wildlife resources. It is Wildlife Branch's concern that wildlife resources receive adequate recognition and protection, and if needed, a land use designation that ensures this.

Acknowledging that Mars Hill area needs a general review of land use codes and activities, the following study has been initiated. The methodology used has been a careful investigation of present land use considering such factors as surficial geology, soils, vegetation, climate, renewable and non-renewable resources and accessibility. Findings of the study point to the area's suitability for wildlife, outdoor recreation, limited mineral extraction and creation of an ecological reserve. It is recommended that the Crown Land Classification Committee adopt future land use coding to ensure that only these activities be allowed to continue in Mars Hill.

Acknowledgements

I wish to thank Dr. Geoff Scott for his thorough review of the original manuscript and for his advice on the geographical and academic requirements of this thesis. Thanks are also given to Dr. Tim Ball who was the second reader of this work. I also appreciate the opportunity and direction given to me by the Crown Land Classification Committee in particular, Mr. Bill Barto and the Crown Lands Branch to compile information for this document. I am grateful for the drafting of this report by Mr. Horst Schell and to Ms. D. Balness and Ms. S. Dembo who typed this report. I would also like to thank my family who listened to my arguments and supplied support and encouragement.

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Preface

In 1988, the Crown Land Classification Committee agreed to the preparation of a Resource Background Report for Mars Hill with the intent that the report would be used to develop a long range land and resource use plan for the area.

This report is an amended version of the unpublished manuscript "A Land Resource Use Study To Determine A Future For The Mars Hill" prepared by Mr. K. J. Tyler.

I. Introduction

Mars Sand Hill commonly referred to as "Mars Hill" is located approximately 55 kilometres north and east of Winnipeg and approximately 30 kilometres north of Beausejour (Figure 1). Geographically this area lies within Township 14 and 15 Range 7, East of the Principal Meridian and located in the northwestern portion of the Rural Municipality of Brokenhead. The study area encompasses approximately 12,000 acres or 4,724 hectares of Crown and private lands. The focus of this study concerns the 3400 hectares of Crown land this study area (Figure 2).

Mars Hill area can be described as a highland drift plain lying above the Red River Lowland plain and generally as an uplands area above the Agassiz Clay Plain. This highland drift plain has a significant elevation due to its glacial and glacial fluvial origin. Here glacial till, outwash, and lacustrine sediments were deposited (Smith and Erlich 1967). Mars Hill is a significant natural resource area that has had only minor land use activities that would threaten its natural qualities.

This study has been undertaken because the Mars Hill has been the subject of ongoing discussion and review by various government departments who seek a more detailed management and Land Use Classification Plan for the area. There have been previous suggestions that the area should become a satellite urban area, provincial park, provincial forest, limited agricultural area, multi-recreational activity area, ecologically significant area or a wildlife management area. Currently the area is classified as an Extensive Recreational Area and Mineral Extraction Area in the Provincial Crown Land Use Classification Plan for Brokenhead River Planning District (Crown Land Classification Committee 1982).

This study will evaluate the area's resource potential relative to agriculture, forestry, wildlife, recreation, mineral resources, surface water, groundwater, and special areas. Using this investigative procedure, the objective will be to make recommendations respecting its long term use and management.

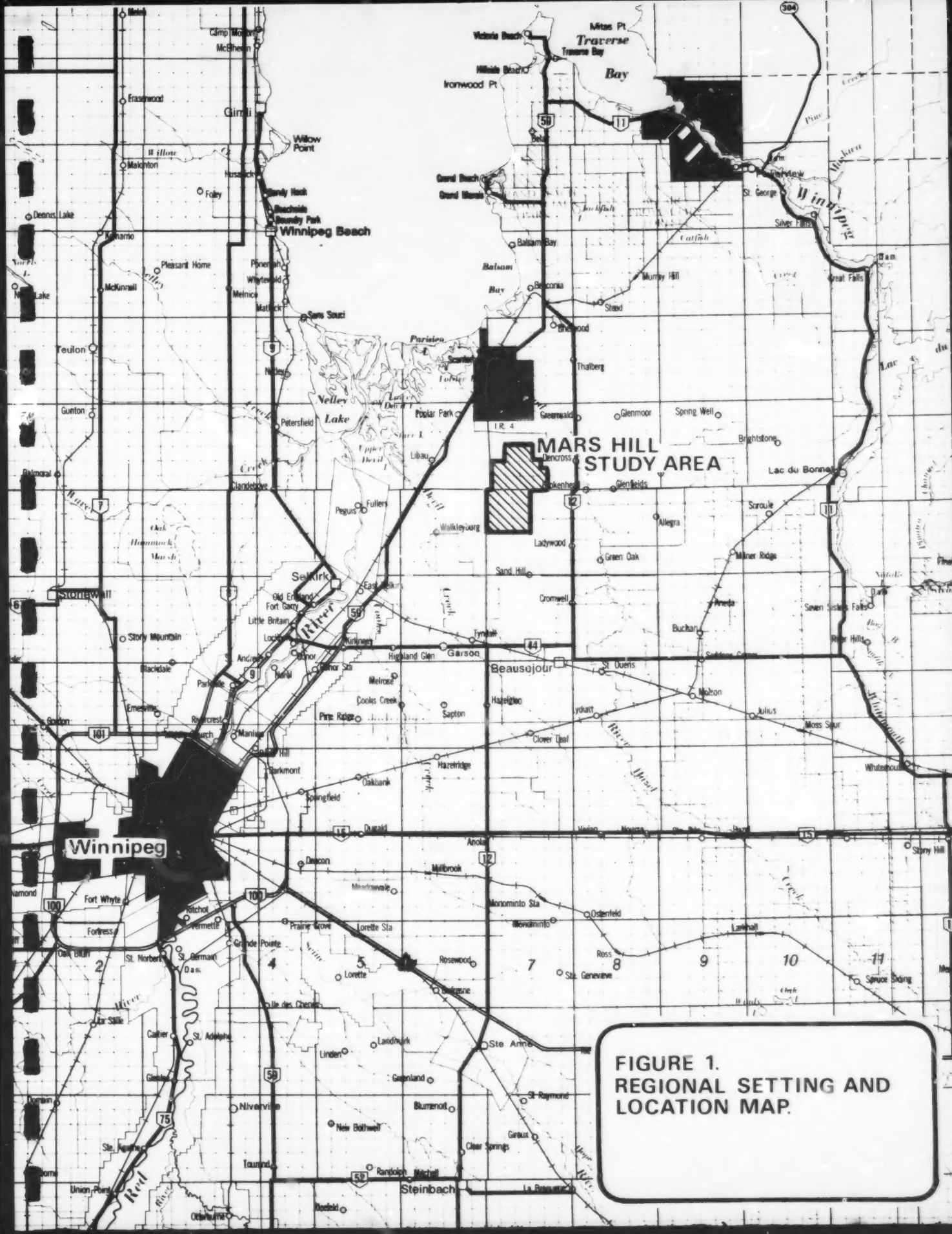


FIGURE 1.
REGIONAL SETTING AND
LOCATION MAP.

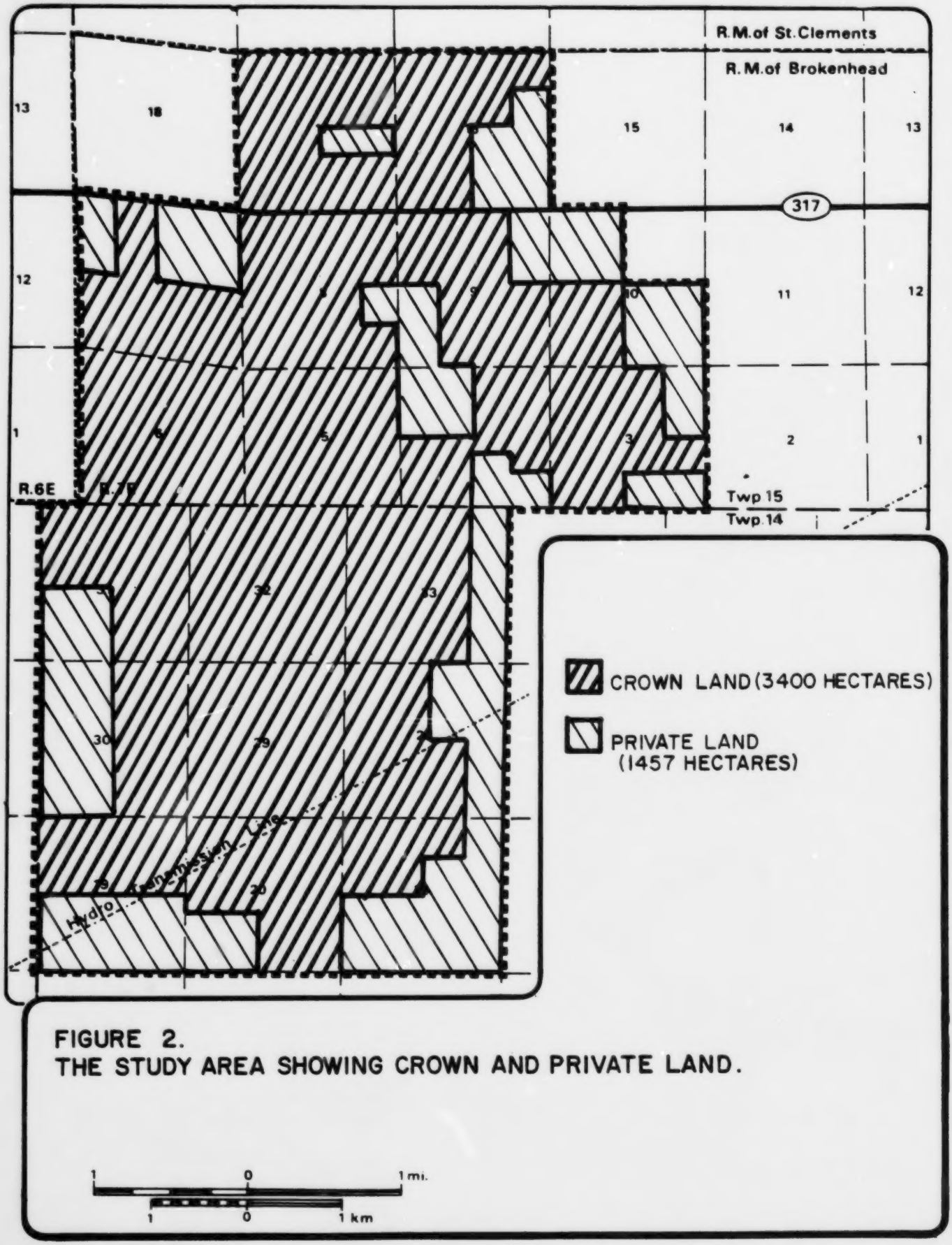


FIGURE 2.
THE STUDY AREA SHOWING CROWN AND PRIVATE LAND.

II. Background

PAST AND PRESENT USE OF THE STUDY AREA

In the past, agricultural use Mars Hill included pasturing cattle and creating haylands for alfalfa. However, most of these agricultural operations proved unproductive due to poor soil quality and lack of soil moisture for proper crop growth. Most farmsteads were abandoned and gradually the land reverted to municipal status. At the present time there is no agricultural activity in the area.

Forestry in Mars Hill has also been limited in the past and only limited harvesting activity has taken place recently. There have been only a few commercial cutting operations and no developmental programs for forest rejuvenation. Forest activity of any real significance has been the cutting of firewood, fence posts, and rails to meet local needs. Forest fires have also taken their toll consuming sizable jack pine stands. Evidence of fire is mainly in the upland areas which have new and immature stands of jack pine (Pinus banksiana). Besides jack pine, there are varying amounts of white spruce (Picea glauca), black spruce (Picea mariana), and aspen (Populous tremuloides) which form part of the main forest cover of Mars Hill.

Presently Mars Hill area abounds in wildlife. There are many game birds, fur bearers, and big game species. Mars Hill has been and is a traditional white-tailed deer (Odocoileus virginianus) wintering area. It has a resident moose (Alces alces) and black bear (Ursus americanus) population. Mars Hill offers the necessary habitat for fur bearers such as weasel (Mustela sp.), mink (Mustela vision), coyote (Canis latrans), fox (Vulpes culpes), and snowshoe hare (Lepus americanus) as well as game bird species such as ruffed grouse (Bonasa umbellus) and sharptailed grouse (Pedioecetes phasianellus). Wildlife thrive, in the quality habitat that predominates Mars Hill, because of the suitable vegetation cover, limited vehicular access and lack of intensive or permanent development.

Recreational uses in the Mars Hill area prevail presently. The major recreational uses are extensive and include such activities as hunting, wandering, berry picking, hiking, horseback riding, and all terrain vehicle riding. There have been requests for more intensive uses such as permanent recreational sites for cottaging, club organization facilities, and motorcross trail systems.

The demand for mineral resources in the Mars Hill area will be evaluated. Current aggregate areas produce such materials as a high quality silica sand, gravel, and general fill materials. Commercial demands include materials for highway development projects while domestic demands, include materials for driveways and septic field systems. All potential quality mineral resource sites must be protected from future undesirable land use practices.

Groundwater and surface water resources require evaluation to ensure that incompatible land uses do not occur. Groundwater resources become vulnerable when aquifers are subject to a source of contamination. Some pollutants quite easily make their way into water-bearing subsurface materials resulting in a groundwater hazard situation. Groundwater resources of the Mars Hill become a concern only if land use activities occur that adversely affect the water or

the use of water. For example, feed lot operations would pose a threat to the groundwater, if animal wastes were allowed to leach into permeable soils overlying aquifers. Surface water resources are an issue because of the scarcity of water. Surface runoff is minimal in areas of porous soils. Consequently cattle and farming operations cannot rely on the availability of run-off as a source of water. Wildlife also do not benefit when surface water is hard to access.

In Mars Hill, there are some special ecological resource areas. These areas are "one-of-a-kind" or representative of natural and preservation of their uniqueness from development and other adverse land uses is a consideration.

THE STUDY AREA AND REGIONAL SETTING

The study area lies in the northeast section of the Rural Municipality of Brokenhead and is accessed by Provincial Highway 317 from the north and from a few local municipal roads lying west, east, and south of the study area. The Mars Hill area is physiographically different from the rest of the municipality and from its immediate area because it is elevated above the Agassiz Clay Plain in a more irregular and hilly manner.

Surrounding the study area and skirting the lowlands section within the study area are clay plain soils which are mainly composed of lacustrine clay deposits with occasional deltaic and outwash materials deposited over them. This, however, is not the case for the uplands area of Mars Hill where soils develop from sandy and gravelly glaciofluvial outwash. The dominating surficial material for this uplands area consists of glacio-fluvial material and littoral sand, gravel, and to a lesser amount clay till. The glaciofluvial material and littoral sand and gravel areas were originally deposited by glacial meltwater either in a broad channel in the glacier or by the edge of the glacier consisting as an outwash area or reworked end moraine (Underwood McLellan 1976). Wave action of glacial Lake Agassiz then reworked these materials to form beach ridges and associated complexes. These complexes were modified by wind action. The clay till areas consist of mixtures of clay, silt, sand, gravel, cobbles, and boulders (Underwood McLellan 1976 and J. Lebedin 1978).

Vegetation in the surrounding area differs from that of the study area. For example, much of the clay plain has been cleared and put into agricultural production. However, where natural vegetation exists it generally consists of mixed deciduous tree species dominated by aspen. Mars Hill, on the other hand, displays a mixed boreal forest cover. Concentrations of jack pine are found in the uplands while the lower sites display a varying mix of aspen and jack pine. The lowest areas, which are the imperfectly drained bog sites, are dominated by black spruce, tamarack, and some marsh grasses.

The study area is isolated compared to the rest of the municipality. Municipal roads and drainage systems service the majority of the agricultural sector of the municipality and outlying areas and to some extent the private lands that fringe the study area. The interior portions of the study area are forested and accessible only by trails which intersect the municipal roads and Provincial Highways 317. The only other point of access is via the Hydro transmission line that is located in the southern sector of the study area (Figure 3).

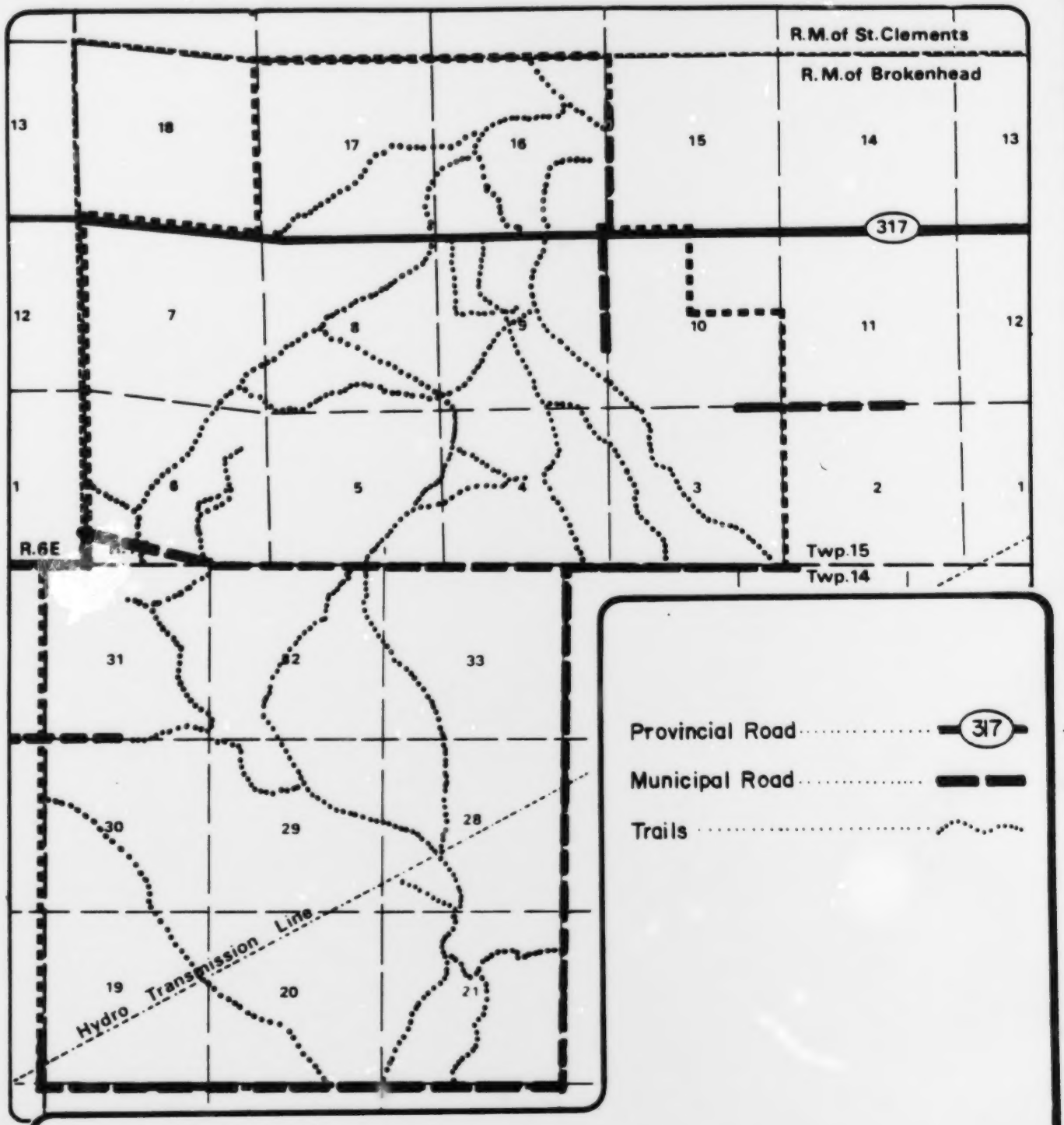


FIGURE 3.
ACCESS TRAILS AND ROADS THROUGH PRIVATE AND PUBLIC LANDS

Because of Mars Hill's isolation there are concentrations of white-tailed deer, moose and black bear. Many other species also take advantage of the area's isolation. Few other areas in the municipality have such concentrations of wildlife.

The physical nature of Mars Hill has more or less dictated the kinds of activity that occurred there. Because of the area's isolation and its forest cover, wildlife can exist and outdoor recreation continues to be popular. Since Mars Hill consists of glacial deposits of sand and gravel, there has been a history of mineral extraction.

CULTURAL HISTORY OF THE MARS HILL AREA

The history of the Mars Hill area can be associated with that of the Municipality of Brokenhead. Development mainly coincided with agricultural settlement during the 1880s and 1890s and continued up until the First World War. Throughout this rural municipality, settlement was sparse with only a few homesteads located near the vicinity of Beausejour. Settlement accelerated in the 1880s when the Canadian Pacific Railway ran a line from Selkirk to Tyndall and then to Beausejour. As farming activities increased some ventures were made into the Mars Hill area, but farming never really stabilized and most of the successful sites that were homesteaded and farmed were mainly on the lowlands. The few that occurred within the upland area of Mars Hill were later vacated. Once vacated the lands reverted to municipal ownership for tax arrears.

In the early 1970s, Manitoba Mines, Resources and Environmental Management determined that land uses for Mars Hill should be compatible with its naturalness. It therefore became necessary for the Department to derive a course of action to ensure that Mars Hill would be protected from illegal land uses such as littering, dumping, etc. To control land use, the Department obtained support from Tourism, Parks and Municipal Planning to recognize the area for its natural qualities with the intention that the area would become a conservation area.

In the promotion of this conservation theme, a land acquisition and land conversion project was initiated in 1976 which included the approval and purchase of 4918 acres or 38 parcels from the Municipality of Brokenhead (Griffin 1976). These lands were located in the uplands area of Mars Hill. The acquisition of this municipal property was partially funded under the Alternate Land Use Program and special provincial warrants (Appendix 1). The entire project became a fifty-fifty cost-shared arrangement with Ottawa. This land conversion project also contained a resource upgrading project which was part of this cost-shared agreement. Funds were made available and utilized in a provincial program to cleanup the garbage dumps, locate and improve trails, remove fences, and post signs. These and other improvement activities continued and from 1976 through 1977 various resource conservation proposals were being considered for the continued management and administration of Mars Hill. Some proposals included converting the area into a reserve for forestry and wildlife purposes. A final land use commitment never occurred because the special funding ceased in 1977 and the study was not completed. However, the many proposals for a final land commitment that had been submitted led to the recommendation by the Crown Land Classification Committee to code the majority of the Mars Hill for "Outdoor Recreational" purposes and other specified lands within the area for "Mineral

Extraction" (Crown Land Classification Committee 1982). This land use coding is still in force and applies to the Crown lands in the study area. All land use activities occurring in the area must be compatible with this code.

Throughout the 1970s and early 1980s many ideas and requests for different land uses for Mars Hill were received. Some included sizable development such as a satellite urban development center and a rural residential cottaging area. Other types of development included a central armed forces maneuvers area and a central sports club facility site. These types of activities may represent a conflicting land use that could impact the present land and resource uses in the area. Such development may not be in harmony with the general conservation theme for the area and could severely impact on the area's wildlife.

The Crown land plan for Brokenhead River Planning District (RM Brokenhead including Mars Hill area) and any subsequent amendment of that plan is under authority of the Crown Land Classification Committee (CLCC). In late 1984, the Committee agreed a review of land use coding and future management of Mars Hill should occur. Preliminary planning work was undertaken and over the period 1985-1987 various resources disciplines were solicited for their interests and proposed management schemes for the area. In 1988, it was agreed the author would prepare for consideration by the CLCC a background report on the Mars Hill area with recommendations for future land and resource use of this area.

LAND TENURE

The Mars Hill study area (Figure 2) is made up of Crown land and private land. This study focuses on the 8,400 acres of Crown land within the Rural Municipality of Brokenhead and excludes private land. There are currently no Crown surface leases or permits in the study area. However, there have been several mineral leases issued for mineral excavation. There are also existing borrow pits on Crown land that are not under a mineral lease.

EXISTING ZONING

Mars Hill is located in the Rural Municipal of Brokenhead. The Town of Beausejour, the village of Garson and the R.M. formed the Brokenhead River Planning District on June 11, 1977. The major objective in the creation of the planning district was to prepare a development plan that considered an objective approach to land use decision-making for all lands in the District.

The Crown Land Classification Committee (CLCC) prepared the Provincial Crown Land Plan for the Brokenhead River Planning District. This Committee is responsible for reviewing and classifying Crown land areas for present and long-term use. Crown land use as prescribed by the plan is administered by Manitoba Natural Resources and Agriculture. This Crown land plan is appended to the Brokenhead River Development Plan and any changes in use can only occur after consultation with the Planning District, the Interdepartmental Planning Board and approval given by the Provincial Land Use Committee of Cabinet. Both district development plan and Crown land plan govern the process of land use decision-making, management and land allocation.

The Brokenhead District Development Plan (Brokenhead River Planning District

Board 1982) has zoned the Mars Hill area as "Rural and Agriculture". This use concerns itself with rural residential development and land fragmentation, and considers conflicts arising between agricultural and non agricultural uses. Some of the objectives for this designation include the following (Appendix 2):

1) To protect the present and future agricultural industry in the Planning District.

2) To prevent incompatible land uses from intermixing.

This zoning only applies to Crown lands that maybe sold or leased to private interests. Where lands remain Crown, land use is governed by the Provincial Crown Land Use Classification Plan for the Planning District.

The current Crown land use plan for Mars Hill has two classification codes. They are (Figure 4 and Appendix 3):

1) Outdoor Recreation - Classification R

2) Mineral Extraction - Classification M

The outdoor recreational code is designed to protect, minimize, and eliminate degradation of the designated recreational lands. It also stresses that no intensive recreational development or resource development projects occur until such time as a specialized identification and use plan can be prepared and reviewed. Only extensive recreational pursuits and limited habitat and forestry enhancement proposals are allowed, but again only if these projects are acceptable and consistent with the natural setting of the area.

The land use code for mineral extraction relates to lands where aggregate leases are located. In some cases mining and extraction have occurred, while in others little development has taken place. The main emphasis of this land use code is to recognize the site's significance and primary use - mineral extraction. No other type of resource use will be allowed unless it is compatible with the intent of the code.

Currently both recreational and mineral use codes exists on lands in the Mars Hill study area. These codes will continue to represent the current land use. Alternative uses not compatible with these codes are not allowed.

PRESENT LAND USE FEATURES

Land use features in the Mars Hill area are very limited and most of the development that has occurred has been on private lands. The developments on private lands include some farm buildings, granary sheds, and other types of structures. On Crown lands the major features include the highway and municipal road accesses, limited drains, and an extensive network of seasonal bush roads and trails. Other recent features include the development of some habitat dugouts and forage plots and some illegally constructed all terrain vehicle trails (Figure 5).

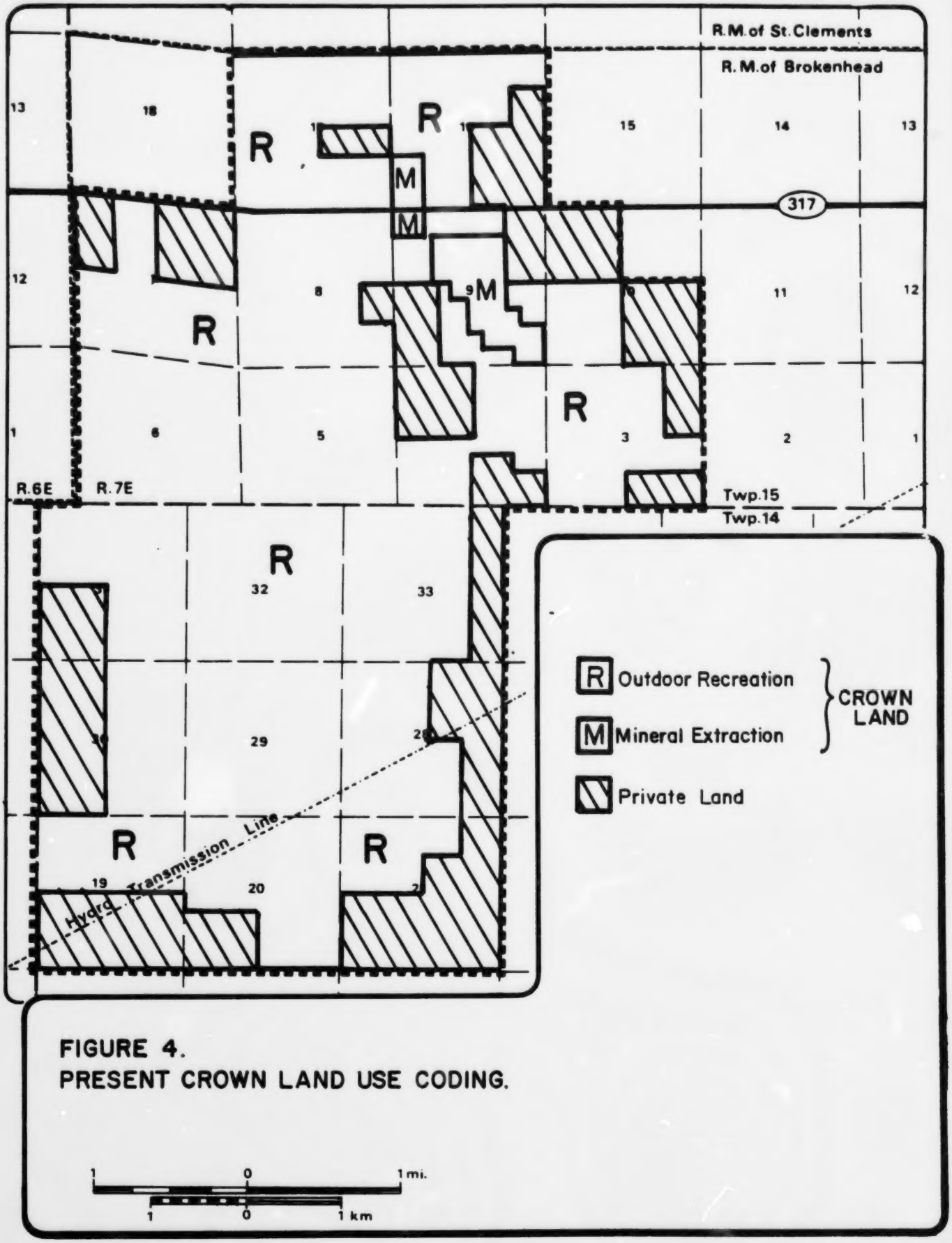


FIGURE 4.
PRESENT CROWN LAND USE CODING.

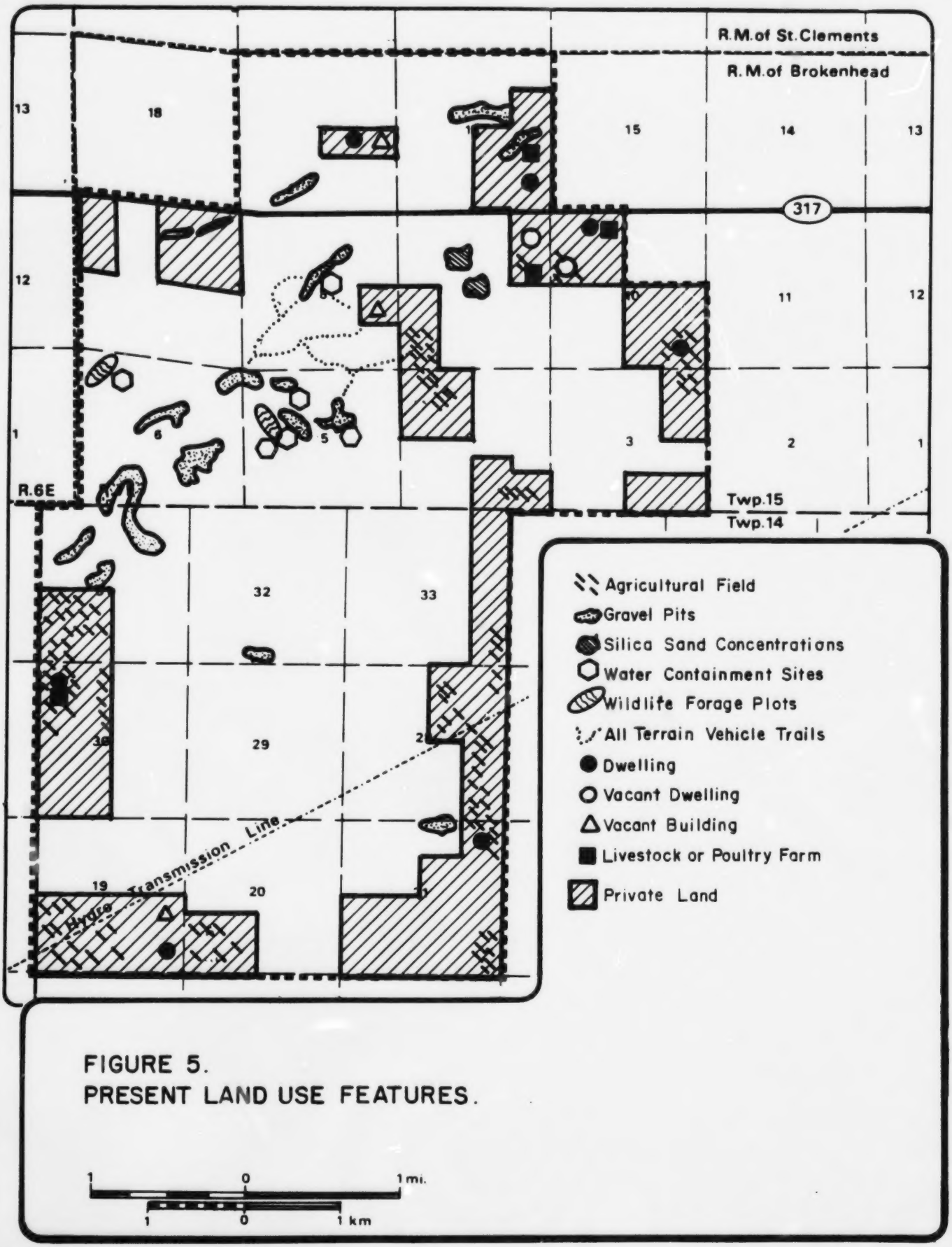


FIGURE 5.
PRESENT LAND USE FEATURES.

Intensive developments have not occurred in the Mars Hill area because of the current land use coding. With the exception of quarry pit removals and access trails, the area is still largely isolated.

III. Physical Geography

PHYSIOGRAPHY

The Mars Hill area lies within two physiographic subdivisions (Figure 6); the Red River Plain Section of the Manitoba Lowlands and the Winnipeg Lake Terrace Section of the Manitoba Lowlands (Smith and Ehrlich 1967 and Underwood Mc Lellan 1976).

The Winnipeg Lake Terrace (an isolated portion of which makes up the upland areas of the Mars Hill area) exhibits a different appearance from the lowland plain. This portion of the Terrace has an elevation of more than 244 meters or 800 feet (Figure 7), while the average elevation of the plain is 229 ± meters or 750 ± feet. The Winnipeg Lake Terrace also consists of different textures of surface materials because of the glaciofluvial activities as opposed to the glacial lacustrine situation of the lowlands where alluvial deposits were left in standing water. This physiographic subdivision and its relationship to elevation is illustrated in Figure 8.

GEOLOGY OF THE MUNICIPALITY AND STUDY AREA

The region's bedrock geology consists basically of three major formations. To the northeast of the municipality is Precambrian Shield rock, to the west are dolostone (Tyndall stone) and limestone, and centred in the approximate east of the north-south line in the vicinity of Highway 12 are sandstone and shale formations (Michalyna, Gardiner and Podolsky 1975; Gardiner, Podolsky 1975; Smith and Ehrlich 1967). The study area falls along the contact between dolomite and sandstone/shale and originated during the Ordovician geological period. The surficial geology of the region was entirely dependent on glacial activity, melt water, and sediment placement from both glaciers and pro-glacial Lake Agassiz. Within the municipal area associated with Mars Hill, glacial-lacustrine deposits and till consisting of clay and silt are common while only a small portion of the area has surface peat deposits which are underlain by lacustrine clay (Lebedin 1978). These organic sites originated in a water saturated environment and developed in depressed lacustrine clay sites.

Mars Hill's surficial geology consists mainly of glaciofluvial and littoral sand and gravel deposits and limited amounts of clay till on the uplands area and to a minor extent has evidence of glacial lacustrine and alluvial deposits in the lowlands (Figure 9). The surface contents resulting from this glaciofluvial activity consists of sand and gravel in varying thicknesses and clay till mixed with silt, sand, gravel, and boulders. Some common soil series associated to this upland plain are the Sandilands-Woodridge soils and Lone Sand soils. The surface content of the lowland plain where glacial lacustrine and alluvial deposits occur include deposits of fine sandy, silty, clayed materials, and some wet organics over lacustrine clay. Some common soil series here are the Poppleton, Marguette, Leary, and Plum Ridge soils. The organics include a mixture of fibrous to mucky peat materials in various thickness (Michalyna et al 1975; Underwood Mc Lellan, 1976; Smith and Ehrlich 1967).

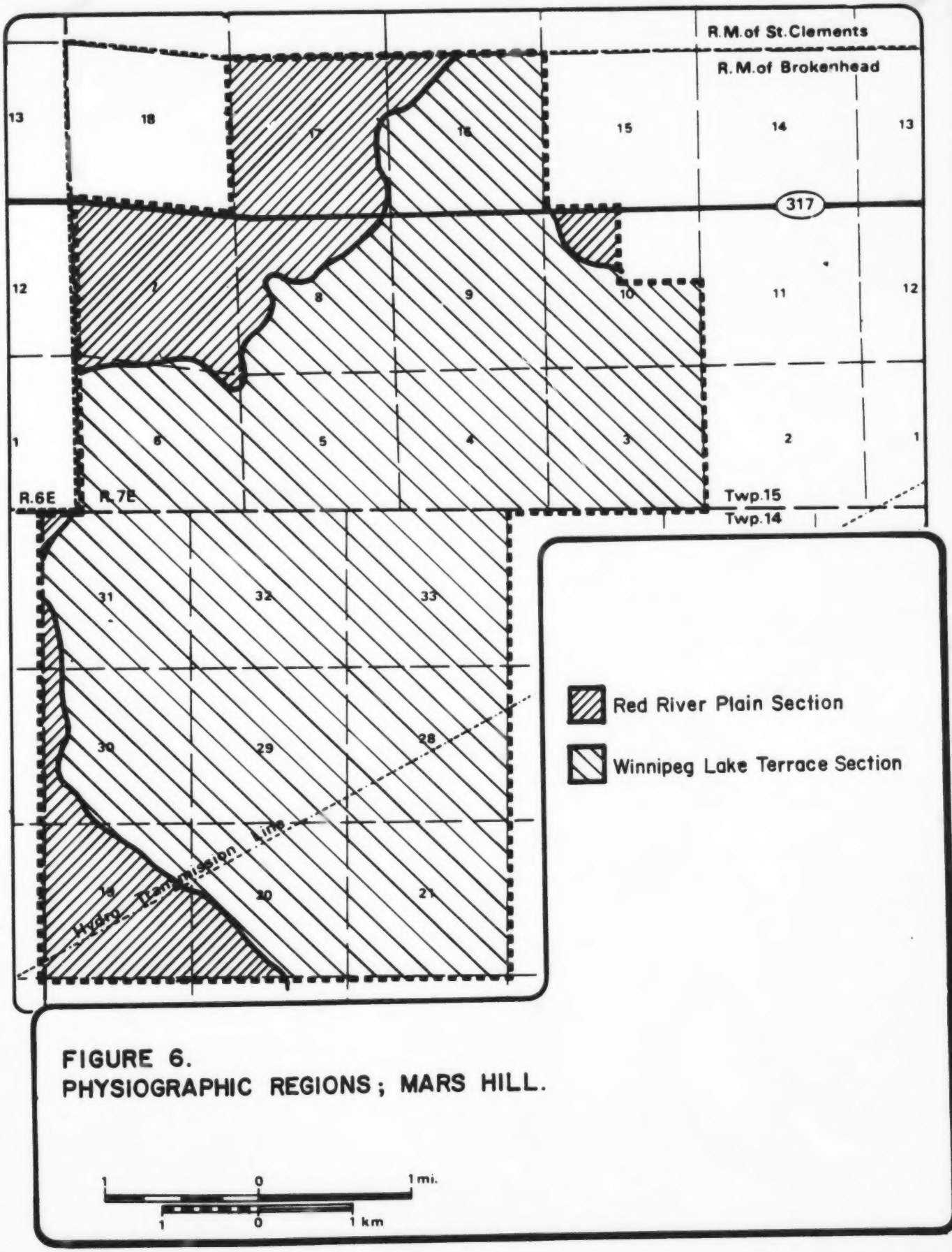


FIGURE 6.
PHYSIOGRAPHIC REGIONS; MARS HILL.

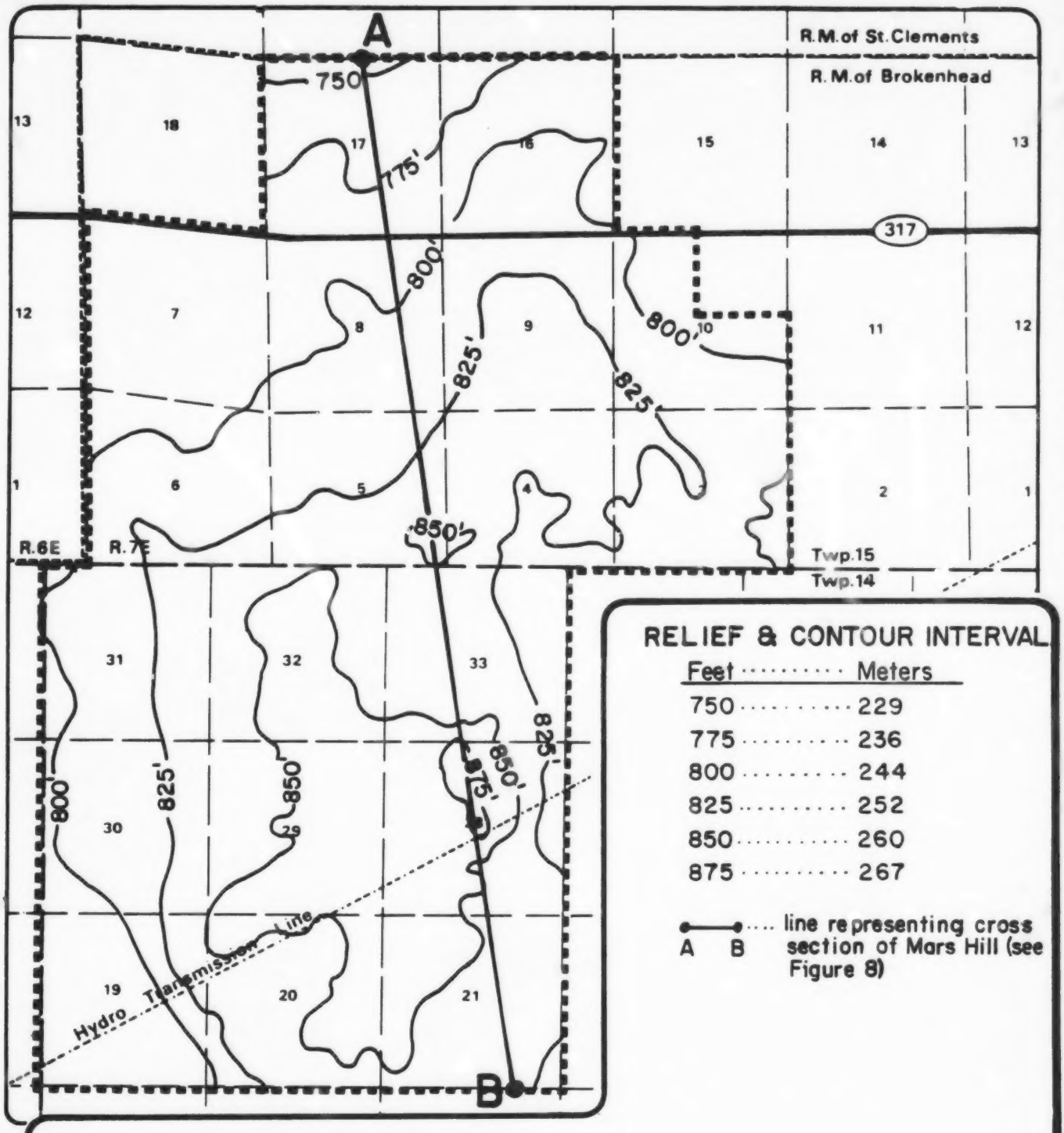
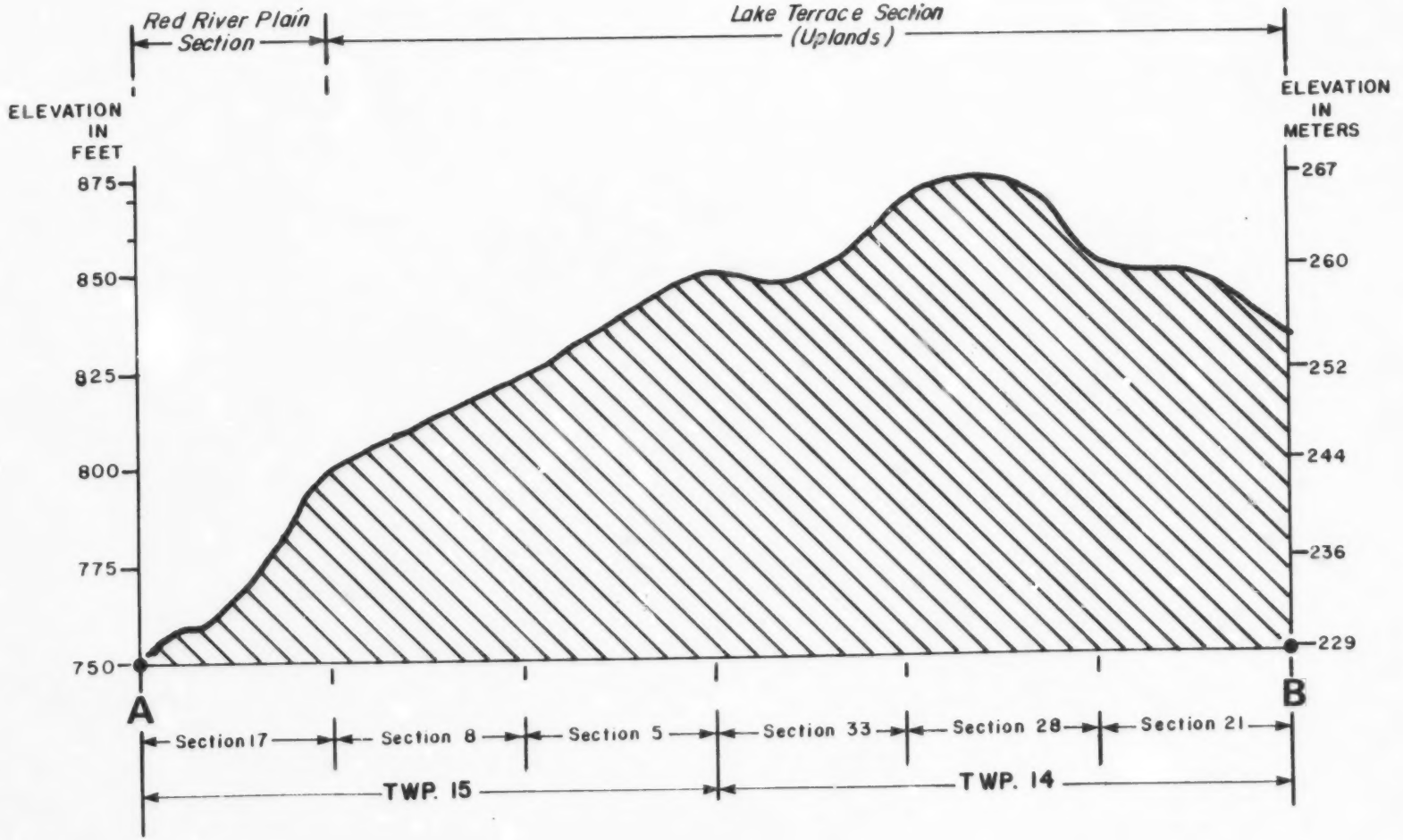


FIGURE 7.
RELIEF AND CONTOUR MAP OF STUDY AREA

FIGURE 8.
CROSS SECTION OF MARS HILL SHOWING ELEVATIONS ALONG LINE A TO B (SEE FIGURE 7).



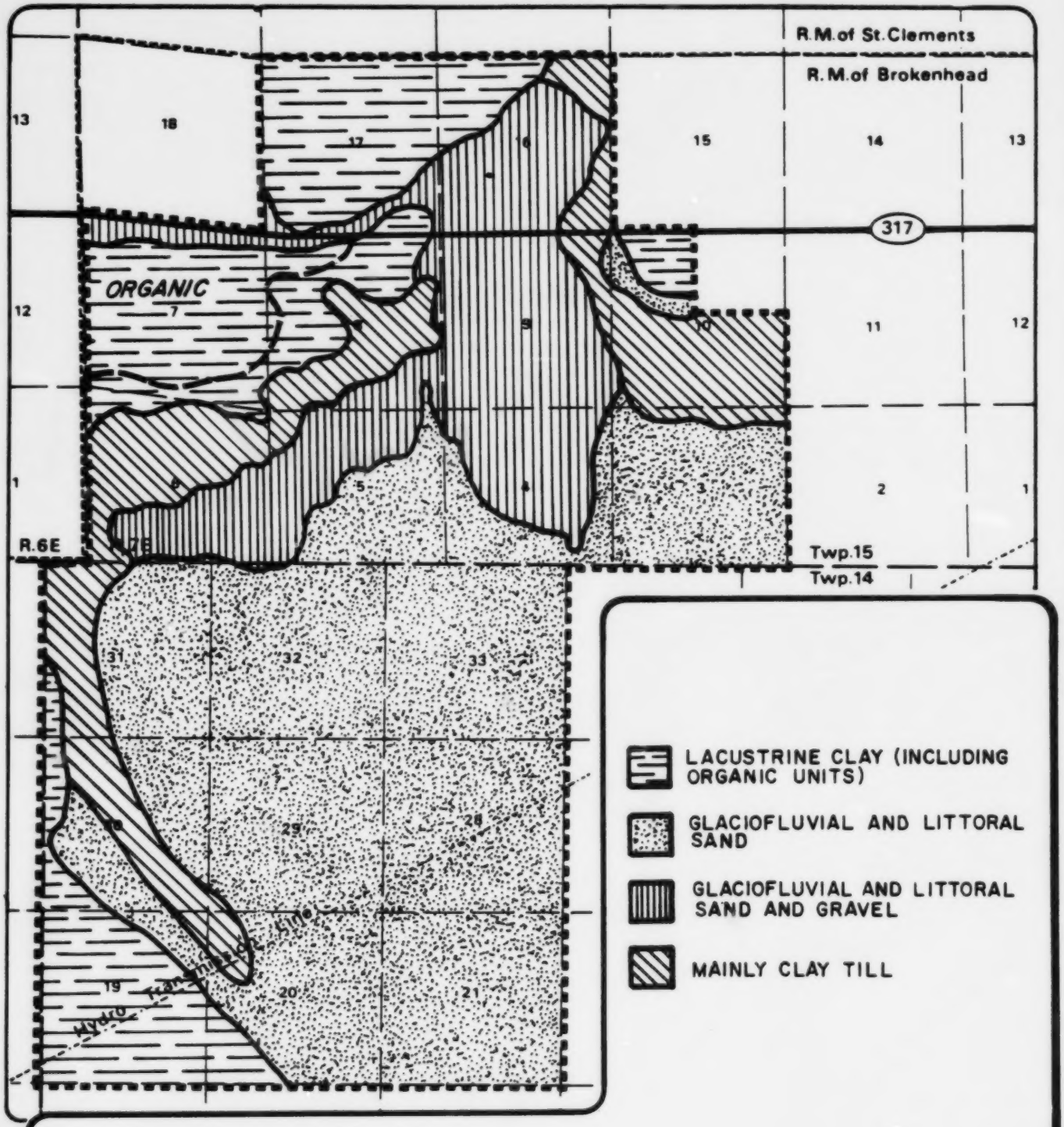


FIGURE 9.
SURFICIAL GEOLOGY; MARS HILL.

SOILS AND VEGETATION

The soils of the study area consist mainly of Chernozemic, Glysolic, Podzolic, and Brunisolic soils. Chernozemic and Glysolic soils are associated mainly with clay plains or the Red River Plain of the Manitoba Lowlands and the lower reaches of the Terrace Section while the Podzolic and Brunisolic soils are associated with the uplands or Winnipeg Lake Terrace Section of the Manitoba Lowlands (Figure 10 and Table 1).

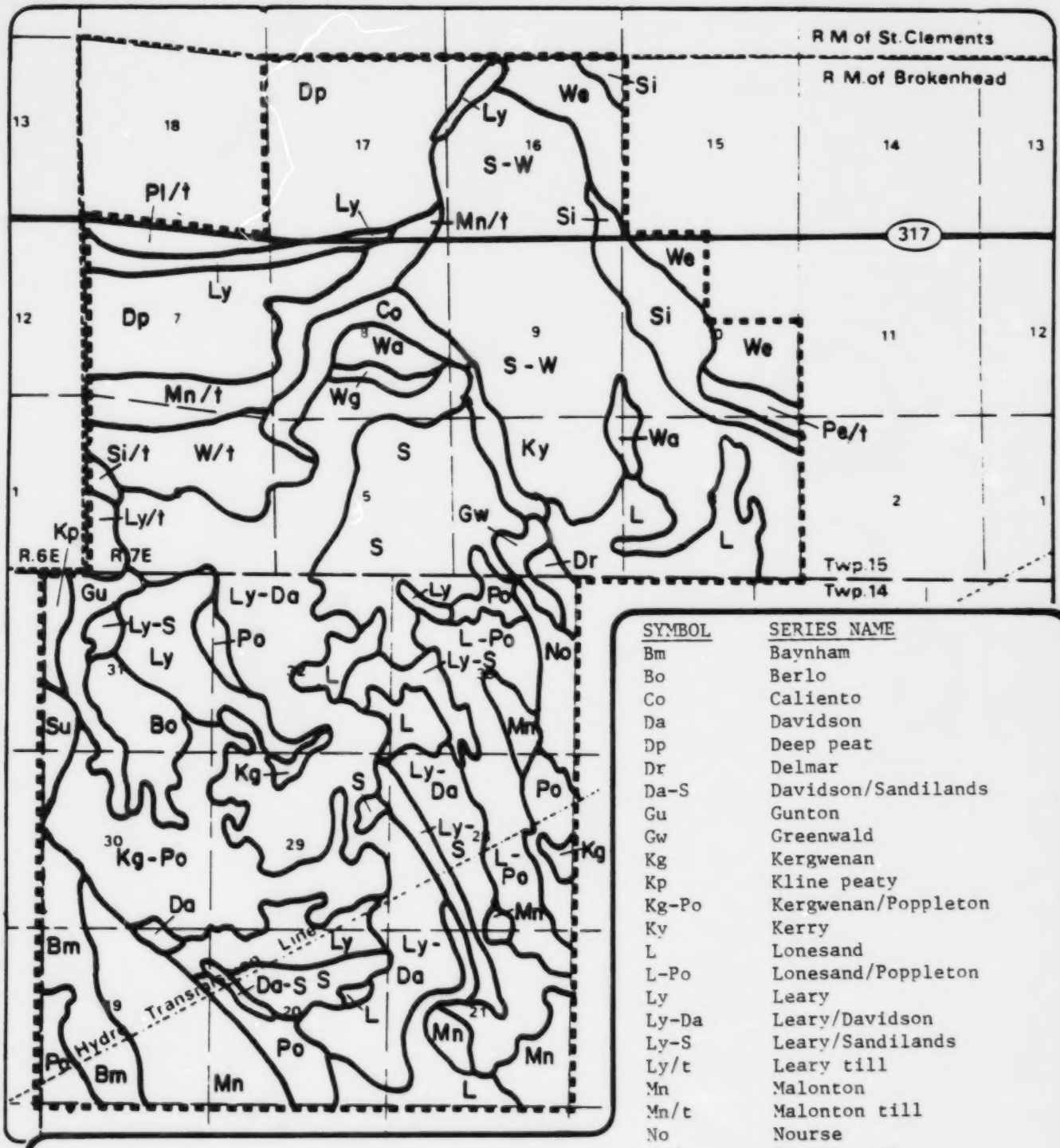
The Chernozemic and Glysolic soils are derived from glacial lacustrine deposits associated with sandy, saline, and clay materials deposited on the Lake Agassiz floor or in stream beds where water disperses. These soils are also associated with a level to gently sloping topography. Occurrences of organic deposits (Fibrisols and Mesisols) are also found in the clay plain-lowlands area. Essentially they are the accumulations of plant remains within a land-locked water-saturated environment on top of clay deposits. The Podzolic and Brunisolic soils are derived from glacial and glaciofluvial deposits (ie. outwash and till) which consist of gravel, some bouldery and sandy end moraine material, as well as beaches, bars, and esker material formations. Such surface materials characterize a topography that is either hilly to gently undulating.

The vegetation in the Mars Hill area is characteristic of the mixed boreal forest. On the wet lowland areas there are sites of mainly black spruce (Picea mariana), tamarack (Larix laricina), and less abundant species such as aspen (Populus tremuloides), black ash (Fraxinus nigra), dwarf birch (Betula glandulosa), balsam fir (Abies balsamea), and balsam poplar (Populus balsamifera). The bog area in the northwestern portion of the study area immediately south of Highway 317 has this type of vegetation along with sites of willow and alder and a variety of plant species common to bog ecosystems (Manitoba Natural Resources 1983; Smith and Ehrlich, 1967).

The vegetation on the upland areas (ie. Terrace Plain) consists mainly of jack pine (Pinus banksiana) and aspen (Populus tremuloides). Jack pine is the dominant species here due to the sand and gravel composition, the excessive drainage, and the poor surface soil moisture volumes. The jack pine and aspen cover according to the 1983 Forest Inventory Data for Manitoba are in such concentrations there is hardly any mention of other species for their inventory purposes (Figure 11). Generally though, other species do exist and include very small quantities of paper birch (Betula papyrifera), bur oak (Quercus macrocarpa), white spruce (Picea glauca), balsam fir (Abies balsamea), black ash (Fraxinus nigra), and Manitoba maple (Acer negundo) (Manitoba Natural Resources 1983).

CLIMATE

The study area's climate is dominantly subhumid, cool continental with high summer temperatures and low winter temperatures (Michalyna et al 1975). There is a period of 120 ± frost free days between the last spring and first fall frost. The area's average precipitation (between May and September) is between 304.8 millimetres and 355.9 millimetres (Weir 1983). Mean daily temperature for January is approximately 17.8 C., while in July mean daily temperature is approximately 20 C. (Weir 1983).



SYMBOL	SERIES NAME
Bm	Baynham
Bo	Berlo
Co	Caliento
Da	Davidson
Dp	Deep peat
Dr	Delmar
Da-S	Davidson/Sandilands
Gu	Gunton
Gw	Greenwald
Kg	Kergwenan
Kp	Kline peaty
Kg-Po	Kergwenan/Poppleton
Ky	Kerry
L	Lonesand
L-Po	Lonesand/Poppleton
Ly	Leary
Ly-Da	Leary/Davidson
Ly-S	Leary/Sandilands
Ly/t	Leary till
Mn	Malonton
Mn/t	Malonton till
No	Nourse
Pe/t	Peguis till
Pl/t	Plum Ridge till
Po	Poppleton
S	Sandilands
Si	Sirko
Si/t	Sirko till
Su	Sundown
W/t	Woodridge till
Wa	Wampum
We	Wentland
Wg	Wintergreen

FIGURE 10.
SURFACE SOILS; MARS HILL.

1 0 1 mi
1 0 1 km

Table 1. Soils of the Mars Hill Study Area

ORDER	SOIL SERIES & FEATURE	VEGETATION COVER (Generalized from Forestry Inventory Data, 1983)
Chernozemic	Po Poppleton either over sand outwash or Lacustine deposits	
	Mp Marquette mixed over Lacustine Clay/Till	
	Kg Kergwenan - Soils over calcareous outwash and beach deposits	
	No Nourse - soils and coarse and medium textured sediments over Lacustine clay	
	Da Davidson on Calcareous sand outwash and Lacustine deposits	Immature & mature jack pine, aspen percentages vary per site.
	Gw Greenwald Series soils develop on sediments over calcareous Lacustine clay	
	Ly Leary soils developed in outwash & beach deposits	
	Pe Peguis soils are gledal clay over till.	
Glysolic	Su Sundown Rego Humic Glysols over calcareouse outwash and beach deposits	Aspen and balsam poplar, black spruce, meadow grasses, willow, alder.
	Mn Malonton (Rego Humic Glysols)	
	I Same as above but with till substrate	
	We Wentland fine sand over Humic Gleysols	

Table 1 continued

ORDER	SOIL SERIES & FEATURE	VEGETATION COVER (Generalized from Forestry Inventory Data, 1983)
Pedsolic	S-W Sandilands - Wood Ridge Complex (Sandy outwash and stratified sand and gravel deposits)	High percentages of jack pine and lower percentages of aspen some immature.
	W - Woodridge (sand)	
	W T - Woodridge till, sand over till	
	SC Sandilands Catena - sand and peat deposits over sand	
Brunisolic	L Lone Sand Series (soils on weak to neutral calcareous sandy deposits)	High percentages of jack pine and lower percentages of aspen some immature
	S Sandilands Series (soils on weak to neutral calcareous sandy deposits)	
	Co Calinto (Dark grey instead)	
	Si Sirko (Grey wooded & calcareous)	
	Wg Wintergreen (fine sand) Sandy outwash & lacustine deposits	
Organics	Bm Baynham (on Lacustine sediments)	Black spruce, tamarack
	Dp Deep peat areas	Black spruce, bog material

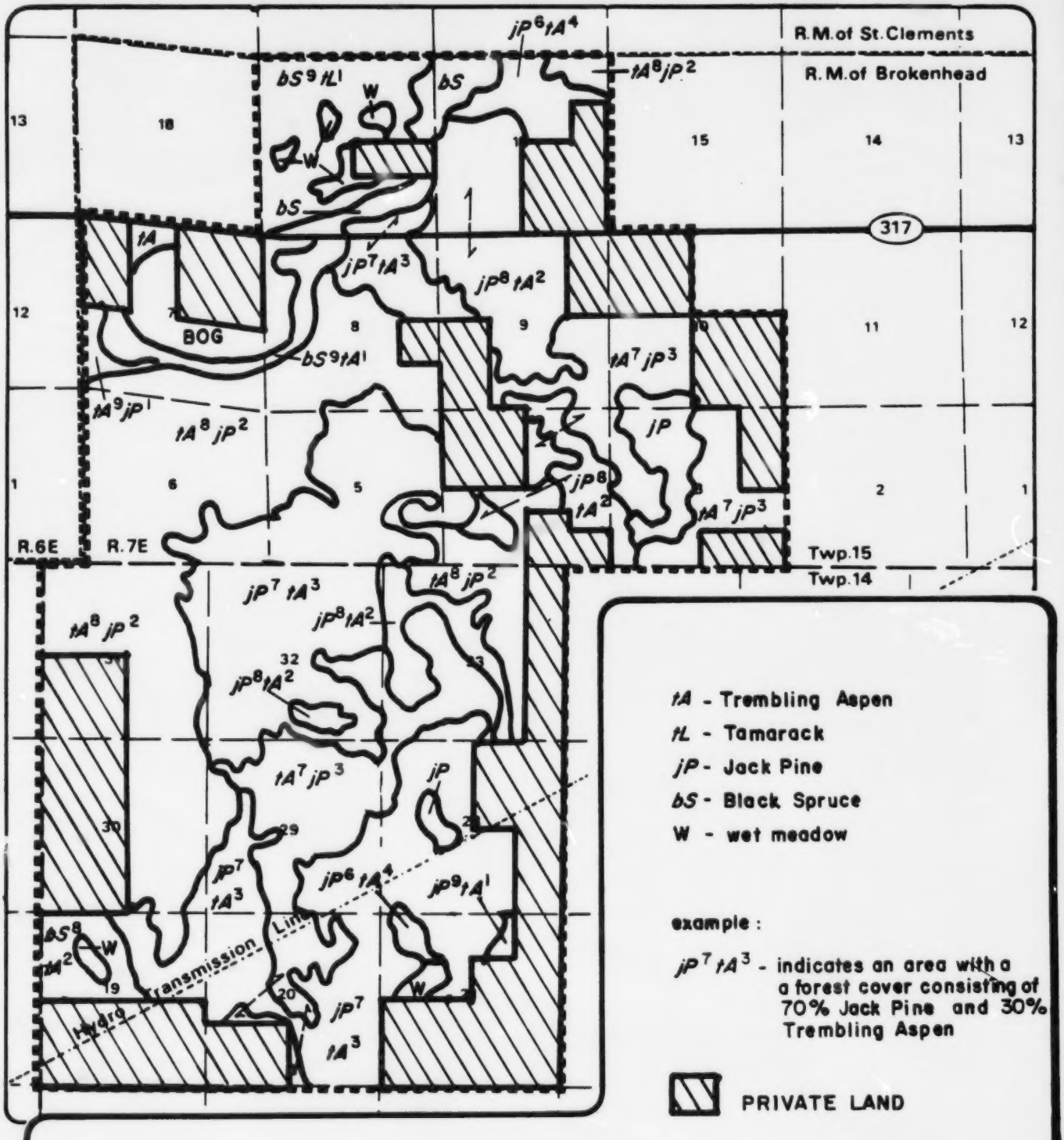


FIGURE II.
GENERAL FOREST COVER ON CROWN LAND, MARS HILL.

IV. Natural Resources

AGRICULTURE

PRESENT AGRICULTURAL ACTIVITY

Agricultural activity in Mars Hill is located on the periphery of the study area. In all cases, agricultural development is associated with private land and includes both cropping and livestock operations. Crown land in the study area has had no agricultural development.

AGRICULTURAL LAND USE CAPABILITY

Mars Hill area for the most part has soils with very poor capability ratings. Range of soil classifications is from Class 3w soils to Class 6s soils (Figure 12). Class 5s soils represent 10 percent of the study area while Class 6s soils represent at least 60 percent of the study area. Both classifications indicate that soils of the uplands area of Mars Hill have major limiting factors in supporting all types of agricultural crops. Some of these limiting factors include restricted rooting zones, low natural fertility, and a low moisture holding capacity. Only Class 3 soils that are located in the lowlands and represent 15 percent of the study area are of a quality to support agricultural cropping. They are classified as having only moderately severe limitations to restrict a range of crops. The remaining 15 percent of the study area is classified as organic and has no rating (Environment Canada 1973a).

The production index of the soils for the study area is understandably low. When reviewing the Manitoba Crop Insurance Corporation's soil productivity rating system it is evident that the Mars Hill area has some very poor soils (Brokenhead River Planning District Board 1980). As Figure 13 indicates, approximately 90 percent of the area has the poorest soils in terms of capability and quality. On a scale of "E" (best soils in terms of yield per acre) to "J" (poorest soils in terms of yield per acre), the rating system indicates that the majority of the Mars Hill has the poorest soils.

AGRICULTURAL POTENTIAL FOR CROPS AND LIVESTOCK

There is very little potential for the utilization of Crown lands in support of crops and livestock within Mars Hill. Crops have not been successful and the production of hay and the quality of grazing land have not been dependable.

SOCIO-ECONOMIC CONCERNS

At this time there are no socio-economic benefits in making Crown lands within the Mars Hill area available for future agricultural production. Costs associated with clearing, breaking, draining, planting, etc. are too high to warrant an attempted alteration of this extremely poor quality, low capability soils. The estimated cost for an agricultural development venture where

bulldozing and clearing and limited drainage occur without disc tilling would be $200 - $250 per acre. With disc tilling the cost could increase to $300 per acre. Discussions with Department of Agriculture officials indicate that such lands should not be considered for agricultural practices. Since approximately 90 percent of the study area's land base has a low capability for agriculture production, the land is clearly best suited for uses other than agriculture.

FORESTRY

PRESENT FORESTRY ACTIVITY AND CAPABILITY

To date there have been no commercial forestry activities in the study area. Forest activities that do occur are the random removal of trees for firewood, fence posts, and rails for local domestic use. Forestry Branch has neither planned for nor conducted any commercial improvement operations within the Mars Hill. Only one small planting operation occurred along the Manitoba Hydro transmission corridor. Here some jack pine (Pinus banksiana) and Scots pine (Pinus sylvestris) were grown for Christmas tree use.

The Canada Land Inventory (CLI) for the Mars Hill indicates that biophysical limitations such as soil nutrients and soil moisture deficiencies prohibit quality merchantable (commercially acceptable) timber production. The map for forestry classifies lands within the study area as 5m and 6m (Figure 14). This means that the annual increment of wood volume under these classifications is of a substantially lower quality. Productivity is stated as being from 31-50 cubic feet per acre per year on Class 5 lands and only 11-30 cubic feet per acre per year on Class 6 lands (Environment Canada 1973b). The overall limiting factors on timber growth in the study area plus the lack of demand for the timber resource have discouraged consideration of the area for serious forestry management.

FORESTRY VOLUME SUMMARY

Timbered areas on Crown land in the study area are in Management Unit 1 of the Provincial Forestry Inventory System. According to the latest volume summary (Manitoba Natural Resources 1983) there are 1,662.4 hectares of merchantable (commercially acceptable) softwoods and hardwoods and 1,263.5 hectares of immature softwoods and hardwoods in Mars Hill (Figure 15). Jack pine represents 78 percent of the total merchantable softwoods while the remaining 22 percent of the area grows white spruce (Picea glauca), black spruce (Picea mariana), and tamarack (Larix laricina). According to forestry inventory and photo interpretation, aspen (Populus tremuloides) represents 95 percent of the total merchantable hardwoods while the remaining 5 percent is represented by balsam poplar (Populus balsamifera), white birch (Betula papyrifera), bur oak (Quercus macrocarpa), white elm (Ulmus americana), Manitoba maple (Acer negundo), and black ash (Fraxinus nigra). By volume, softwoods dominate the hardwoods by nearly a 2:1 ratio (Table 2). The volume figures for merchantable timber are not considered sufficiently high enough to warrant any forestry utilization programs.

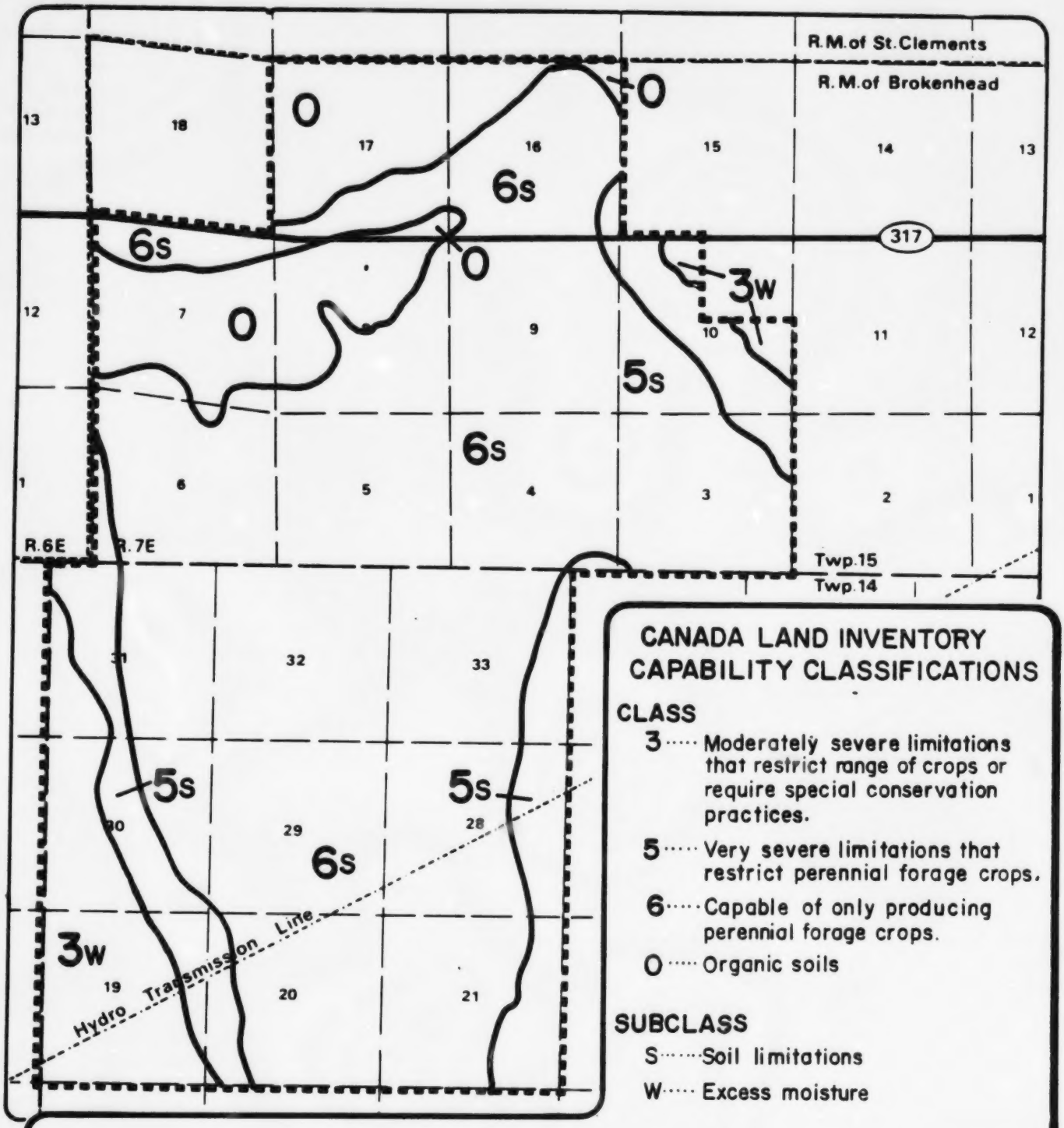


FIGURE 12.
SOIL CAPABILITY FOR AGRICULTURE; MARS HILL.

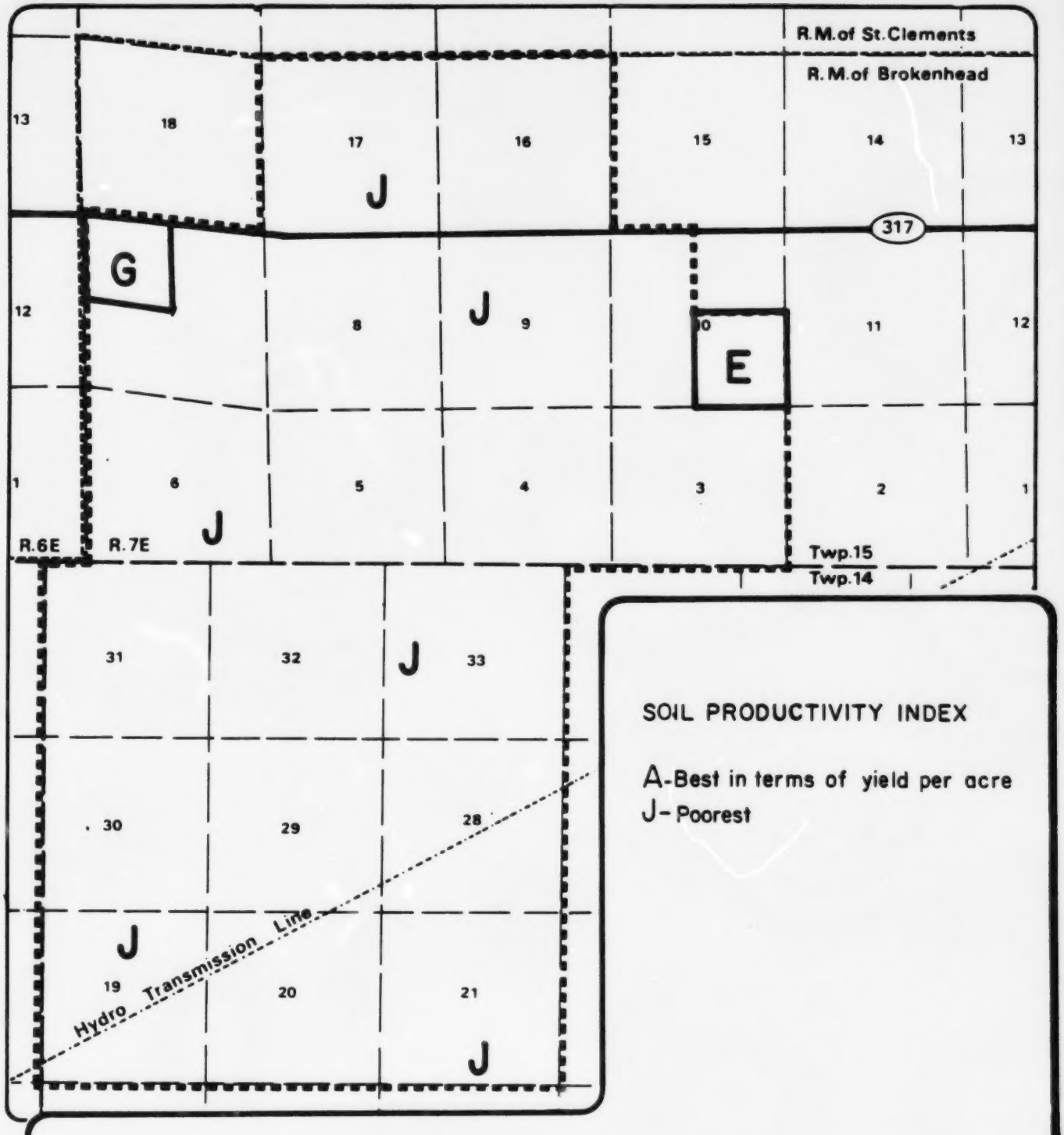
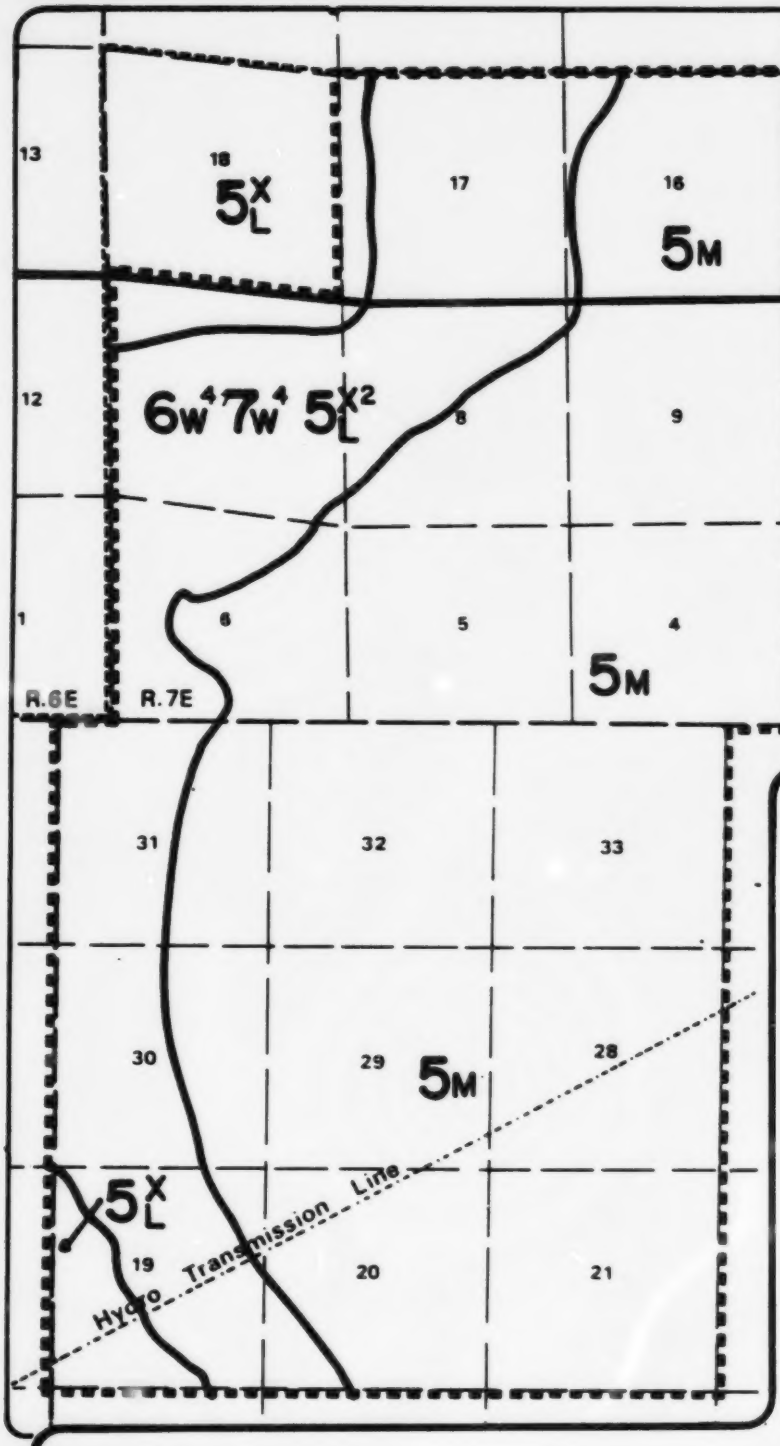


FIGURE 13.
SOIL PRODUCTIVITY; MARS HILL.



CANADA LAND INVENTORY CAPABILITY CLASSIFICATIONS

CLASS

5···· severe limitations to the growth of commercial forests.
·····productivity range - 31-50 cu. ft per acre per year.

6···· severe limitations ·····
·····productivity range - 11-30 cu. ft. per acre per year.

7 severe limitations which preclude the growth of commercial forests.

SUBCLASS

···· M - soil moisture deficiency
···· W - soil moisture excess
···· X - 'M' & 'W' combined
···· L - nutrient problem - high carbon levels.

FIGURE 14.
SOIL CAPABILITY FOR FORESTRY; MARS HILL.

1 0 1 mi.
1 0 1 km

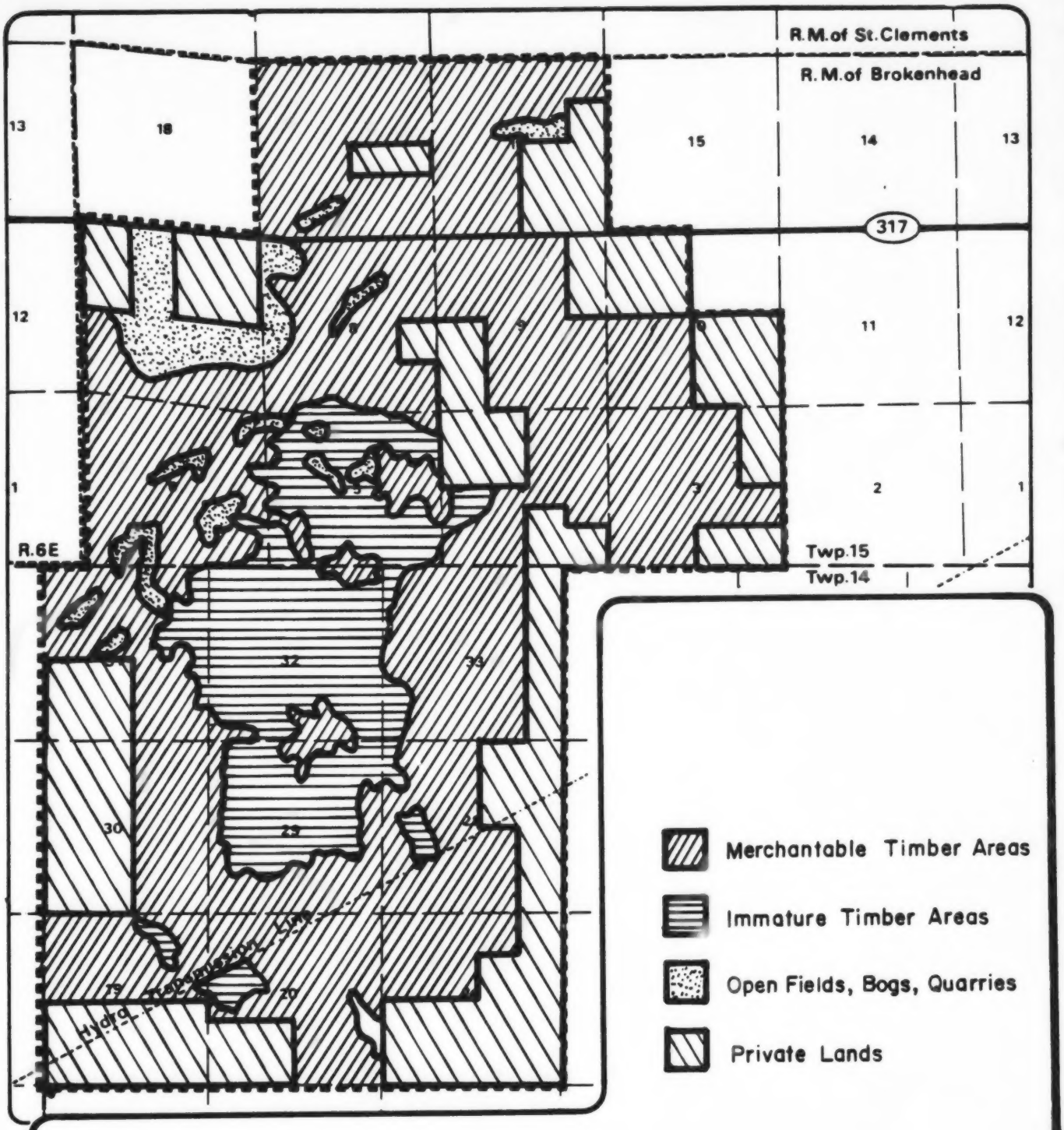


FIGURE 15.
MERCHANTABLE AND IMMATURE TIMBER AREAS; MARS HILL.

Table 2. Volume Figures for Merchantable Timber, Mars Hill Area

Species	Volume in cu. meters[1]
Jack pine	67,490
White Spruce	1,212
Black Spruce	16,297
Tamarack	1,515
Total Softwoods	86,514
Aspen	43,197
Total Hardwoods	43,597
Total Merchantable Timber	130,379

[1] These figures are derived from summary calculations of the volume stock in Township 14, 15 Range 7 East. Forestry Inventory site, age, and class calculations are also applied in order to gain a final cubic meter volume for merchantable (commercially acceptable) softwood and hardwood species (Manitoba Natural Resources 1983). Merchantable means the timber has matured to specified age, diameter, height, and quality for commercial acceptability.

FORESTRY POTENTIAL

The Mars Hill has only a limited potential to grow merchantable timber. The 1,662.4 hectares of merchantable timber now growing in the study area represent 130,279 cubic metres of softwoods and hardwoods. There are also 1,263.5 hectares of land with immature softwoods and hardwoods that could develop into a merchantable forest at a future date.

The Mars Hill area's timbered land is neither as productive nor as marketable as the more heavily timbered areas near Lac du Bonnet and Pine Falls. The Forestry Branch considers Mars Hill a natural area with timber value and productivity insufficient for present day consideration as a provincial forest. This area will not be considered for any future forest development schemes. Preference is being given to the primary timbered areas to the north.

SOCIO-ECONOMIC CONCERNS

The forest industry contributes significant socio-economic benefits to the Province of Manitoba. If the Mars Hill were included in this picture then a value could be placed on its merchantable timber. In fact this value based on a "gross value of shipment" in 1983 dollars would be roughly $4,232,102.00. But should the socio-economic value of the forestry resource of Mars Hill be viewed in terms of revenue from harvested timber or are there other ways to

utilize the forested area ? If provincial forest status were considered for the Mars Hill then eventually provincial dollars would have to be spent on such things as stand improvement, new stand creation, etc.. Management would include the investigation of markets and eventual timber sale allocations.

However, if the Mars Hill remained a natural forested area, uses of the forest resource would be limited and might only include such activities as post, pole, and firewood harvesting operations. There would be very little forestry management and hardly any revenues generated. On the other hand there would be no investment required by the province for management operations.

Table 3. Value of Merchantable Timber; Mars Hill Area [1]

Timber Dues Method

Softwoods	86,514 cu. m.	x $1.80 per cu. meter	= 155,725.00
Hardwoods	43,865 cu. m.	x $0.45 per cu. meter	19,739.25
		Total Timber Dues Value	$175,464.25

Gross Value Method (based on 1983 dollars)

Total Volume of merchantable timber 130,379 cu. meters

Value per cu. meter @ $32.46

Total Value of Standing Timber $4,232,102.30

Logged Timber Value at Mill Site F.O.B.

Total Volume of Merchantable Timber	130,379 cu meter
F.O.B. Mill Price of Logged Timber average	$101
Total Value of Merchantable Timber F.O.B. at the mill site	$13,168,279.00

[1] Liquidation value based on a time cut of the area with no forest management and does not account for cost of harvesting and transportation.

WILDLIFE

PRESENT WILDLIFE ACTIVITY

Wildlife in the Mars Hill area includes game, non-game, and fur bearing species. The area's main features include its deer wintering and summer habitat areas, moose wintering and summer habitat areas, black bear denning areas, wild fur species, upland game, and non-game species of reptors and passerines.

Mars Hill is a provincially significant regional wildlife area. It offers a unique natural setting for wildlife to flourish and so far man's activities have not seriously affected the Mars Hill environment. As a result, stable populations of wildlife are noted in the area. These wildlife populations are considered for both consumptive and non-consumptive purposes by local residents of the municipality as well as by people from outlying areas such as Libau, Selkirk, and even Winnipeg. Generally people appreciate and take advantage of the proximity of Mars Hill when wildlife related activities are considered.

Traditionally Manitobans value and use wildlife for food, income, recreation, and science. Mars Hill offers all these features and in fact wildlife in Mars Hill are hunted, trapped, viewed, and studied. Mars Hill has a tremendous provincial significance for being retained as a natural area and wildlife area. It is estimated that in the late 1970s a minimum of 2,200 people visited Mars Hill on an annual basis (Thompson 1978). Big game hunting, subsistence hunting, upland game hunting, trapping, and the viewing of wildlife were major reasons for the area's popularity.

WILDLIFE CAPABILITY AND HABITAT

The land capability for wildlife ungulates in Mars Hill is relative to the quality and quantity of food, protective cover, and space required by the individual species in order to survive, grow, and reproduce. The CLI Land Capability ratings (Figure 16) for Wildlife ungulates in Mars Hill ranges from a significantly high Class 3 rating to a lower Class 6 rating (Environment Canada, 1973c). The majority of the Mars Hill is designated Class 4 and 5 and represents 80 percent of the land area. Land areas in this rating are described as imposing moderate to moderately-severe limitations on the production of ungulates. The remaining lands are rated Class 6 (severe limitations to the production of ungulates) and Class 3 (only slight limitations to the production of ungulates). Class 6 lands account for 10 percent of the study area while Class 3 lands account for only 5 percent of the study area.

Ungulates are only a small portion of total wildlife in the area. Although the majority of the lands are Classed as 4 and 5, some of these lands will have a more favourable habitat situation once site improvements occur. For example in 1987, Manitoba Natural Resources, Wildlife Branch developed both water holes and forage plots at specific sites in the uplands (Figure 5). The waterholes provide white-tailed deer and moose with a more dependable source of drinking water, while the forage plots provide deer with a more reliable nutrient source. Further improvements are being considered, such as the rehabilitation of the many depleted gravel pits. Wildlife habitat improvement techniques for depleted pits

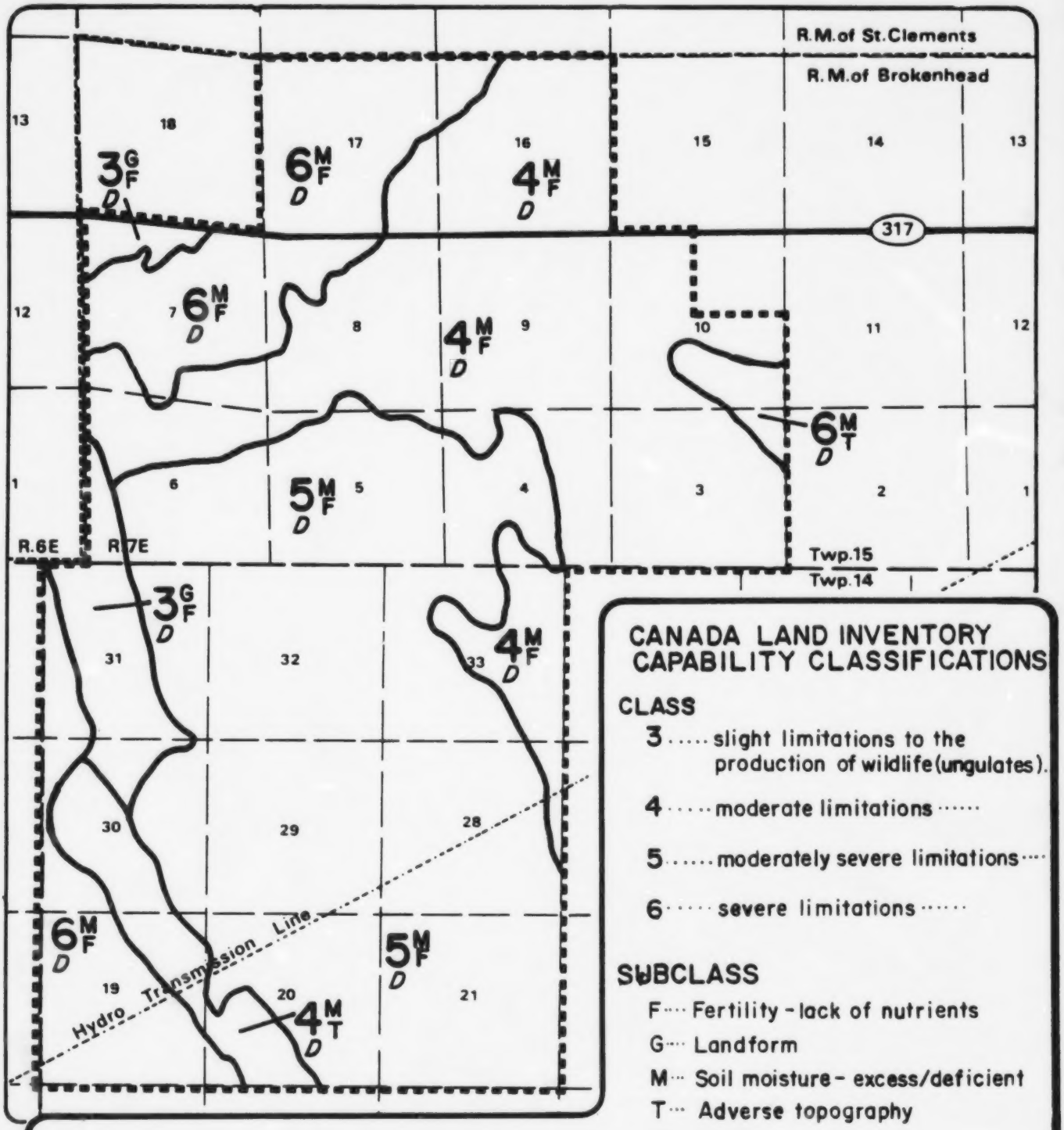


FIGURE 16.
LAND CAPABILITY FOR UNGULATES ; MARS HILL.

include clay lining for water containment, specified sloping, and vegetation regeneration. All of these strategies are designed to improve the habitat on the Class 4 and 5 land areas of Mars Hill.

Wildlife managers praise the Mars Hill's relative isolation, lack of intensive development, and extent of vegetation cover. Vegetation cover is important to ungulates and other wildlife species because it ensures a stable food source, offers protection from predators, supplies the necessary space for various wildlife species to reproduce, and even offers thermal protection from adverse climate conditions.

In Mars Hill wildlife species take advantage of all types of vegetation cover (Figure 17). Generally in late spring, summer, and early fall white-tailed deer prefer thick wooded aspen and mixed aspen-jack pine areas. Ideal sites range from 50 percent to 100 percent aspen. Moose during this time favour the limited wet and saturated sites of Mars Hill. These include sites in the vicinity of the Libau bog as well as the black spruce area in the southwest portion of the study area. Black bear seem to favour the areas immediately off the lowlands along the edge of the uplands for denning. They move throughout the upland area in the spring, summer, and fall seasons. Other wildlife such as coyotes and foxes also favour this upland area as a denning and general habitat area. Ruffed and sharp-tailed grouse are also seen frequently on the uplands and they like the mixed-wooded areas of aspen and jack pine as well as the open areas and edge areas of jack pine and aspen stands.

In winter, white-tailed deer move out of thickly vegetated deciduous and mixed wooded areas to central upland areas where they can take advantage of dense immature jack pine cover for thermal protection. When temperatures moderate they move to the more open jack pine and aspen areas. Moose on the other hand move out of the heavy black spruce areas into the areas classified as summer deer habitat where browse underbrush vegetation is located.

AREAS OF SIGNIFICANT WILDLIFE RESOURCES

It appears that both upland and lowland forested areas, the bogs and wet lands, as well as fields and even some of the depleted gravel pits that sporadically hold water are continually being utilized by wildlife. Wildlife are doing well in the Mars Hill and there is no reason to believe that they could not continue to do so if the area remains in its present undisturbed state.

WILDLIFE INVESTMENTS

The only significant investment towards the promotion of wildlife are the habitat improvement forage plots and the water dugouts. However, some preliminary discussions on gravel pit rehabilitation have occurred. It is the desire of the Wildlife Branch to improve each site once all of the resource is removed.
If the Mars Hill area was made a Wildlife Management Area status other types of investments would occur. A habitat enhancement program is one of the many possible programs that will be investigated for the Mars Hill if a greater emphasis is placed on the wildlife resource.

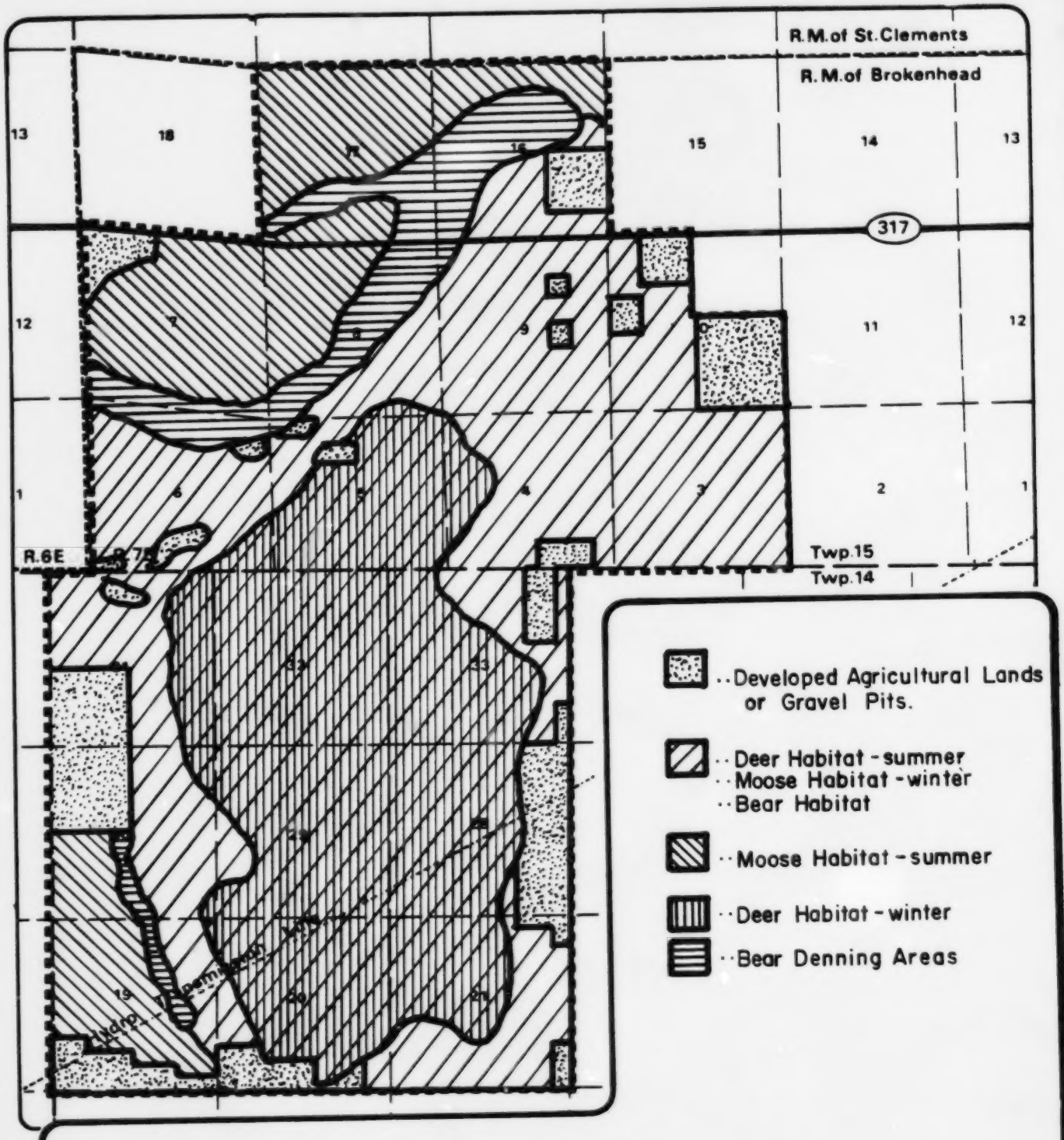


FIGURE 17.
SEASONAL HABITAT FOR UNGULATES AND BEARS; MARS HILL.

SOCIO-ECONOMIC CONCERNS

Obviously sport hunting for deer, moose, black bear, and the upland game bird species has economic benefits attached. There is also value in the trapping of fur bearing species. No figures have been compiled to provide a net or gross value of hunting or trapping in the Mars Hill nor is it known how many people use the area for these purposes. It is also difficult to put a value on the social benefits derived from the wildlife in the area. But there are social benefits that involve the use of the area itself. These include recreation, education, and scientific involvements.

Another socio-economic issue is the conceivable problem facing the outlying farm operations that could experience predation/grazing problems from ungulates and bear. There will be a need to monitor the movements of some wildlife species and plan for potential problems. However, Wildlife Branch officials are now of the opinion that regular or special hunting seasons will eliminate the problem.

RECREATION

PRESENT RECREATIONAL ACTIVITY

Crown land areas in Mars Hill are used for recreational purposes which include sport hunting, hiking, skiing, snowmobiling, all terrain vehicle riding, berry picking, viewing, and educational touring. Annual reports vary on the number of people who frequent the area, but probably a minimum of 2,200 people visit this area yearly (Thompson 1978; Brokenhead River Planning District Board, 1980). All recreational use occurring in Mars Hill is termed "extensive" use, that is, no intensive development has been established. The only recreational activity of concern is the unauthorized clearing of new trails for all terrain vehicle use which may interrupt and to some extent destroy prime wildlife habitat. The bases for these operations appears to be on private land holdings or at some of the depleted gravel extraction sites common to the area.

RECREATIONAL LAND USE CAPABILITY

The Canada Land Inventory for Recreation (Figure 18) designates 90 percent of the study area as a Class 5 Q-E area with another 10 percent as Class 6 PDE (Environment Canada 1973d). Class 5 and 6 lands have a moderately low to low capability for outdoor recreation. However, the Class 5 rating for 90 percent of the study area is now considered to be inaccurate and a re-evaluated rating of the area would make the classification higher. There are some very favourable features about the study area that could improve this rating. Some of these features include its proximity to the populated urban areas, its easy accessibility to the periphery areas, its naturalness (attractive vegetation, topography, and limited infrastructure), and its wildlife resources. All of these features make Mars Hill a quality outdoor recreational area that will attract the general public. Whether or not a new outdoor recreational classification rating is required has yet to be determined. However, it is to recognize the area's outdoor recreational potential,plan for it, and make it compatible with the natural and renewable resources (wildlife) of the area.

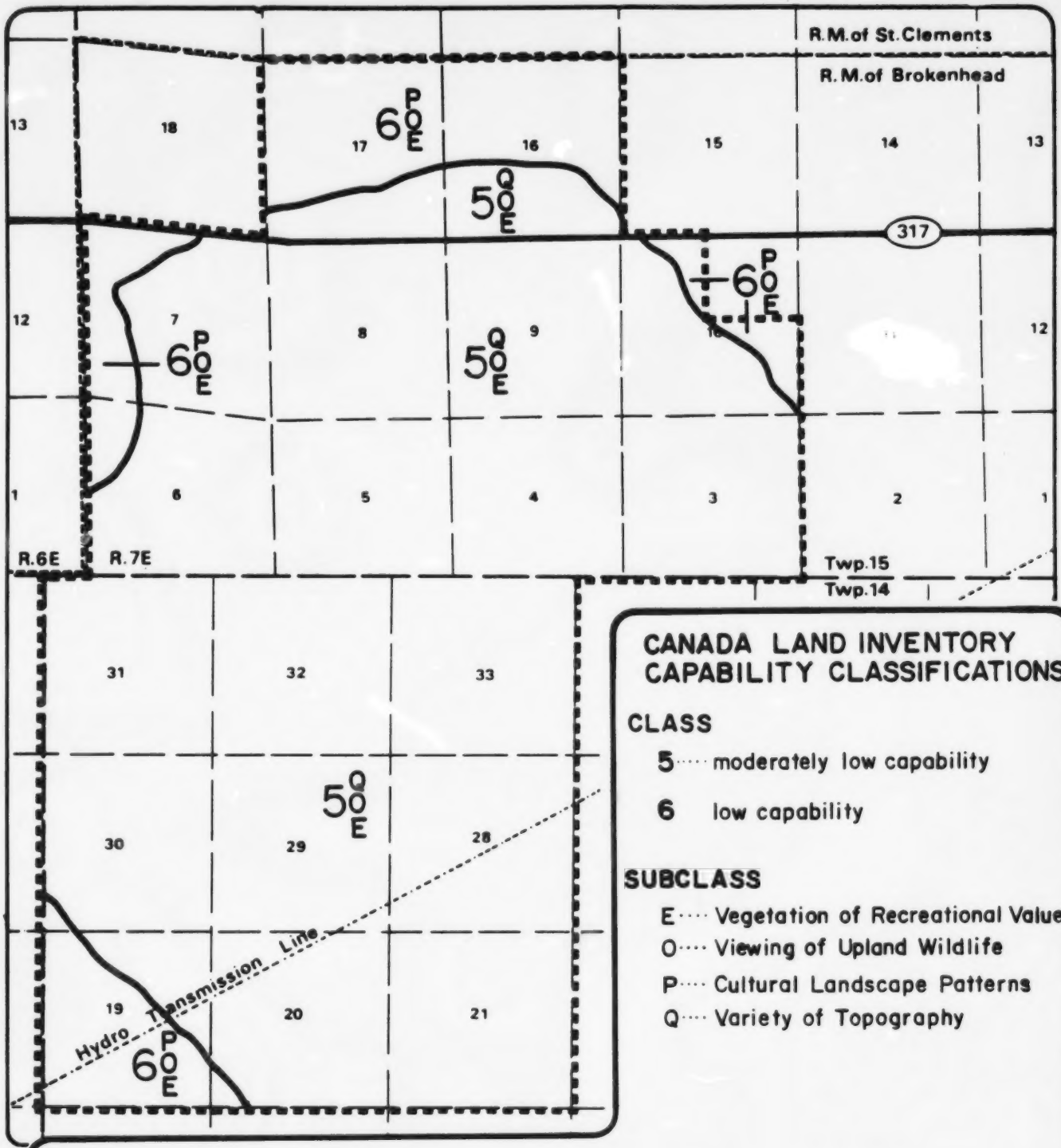


FIGURE 18.
LAND CAPABILITY FOR RECREATION; MARS HILL.

RECREATIONAL USE: INTENSIVE VS EXTENSIVE

Presently Mars Hill has no intensive or permanent recreational activity centers; there is only day use of the area.

If designed areas were required, Mars Hill has upland sites that could be selected for some types of group facility uses. For example club organizations may want car parking, overnight camping, designated trails for walking, skiing, snowmobiling, or all terrain vehicle use which could be accommodated. However, isolated cottaging or permanently located clubhouses must be evaluated because such permanently based activities could have a significant impact on the area and its resources. For example, there would be a higher fire risk than at present, and the wildlife habitat and other significant areas could be impacted due to possible over use, etc.

Whether more or less intensive use is made of Mars Hill will depend on the value placed on natural habitat versus a moderately developed area strategy. If a semi-wilderness natural environment is preferred the uses of the area could be limited to extensive uses only.

MINERAL RESOURCES

SURFICIAL AND BEDROCK GEOLOGY

In the Mars HIll area surficial deposits of aggregate material owe their origins entirely to glacial activity, melt water, and sediment placement in glacial Lake Agassiz. Mars Hill has extensive surficial sand and gravel deposits and some of these deposits are found in such quantity and quality as to promote mineral extraction. Due to the thickness of the overlying regolith on bedrock, surficial geological issues are the most significant to Mars Hill.

PRESENT MINERAL AREAS AND RESOURCES

Commercially valuable materials include quality sand in the form of pure silica (SiO_2), sand and gravel mix, and loose gravel materials. These resources are used by the construction industry, by the municipality and the Provincial Government for road bed and highway development projects. This nonrenewable mineral resource needs to be identified and its use managed so that conflicting land uses do not occur in the area. Many significant mineral potential sites have been identified (Figure 19) and the major concern is to ensure that the nonrenewable aggregate resource is recognized and unwanted surface development is not allowed until the mineral resource is depleted.

MINERAL POTENTIAL

Major deposits of sand and gravel, and silica sands have been identified in Mars Hill but there may be many other small areas that have mineral potential. New aggregate removal sites may be explored when contract awards for highway construction occur and more gravel is needed. Because of the nature of the surficial geology of the area, test removal sites have occurred randomly. True estimates of the mineral potential for Mars Hill are not known.

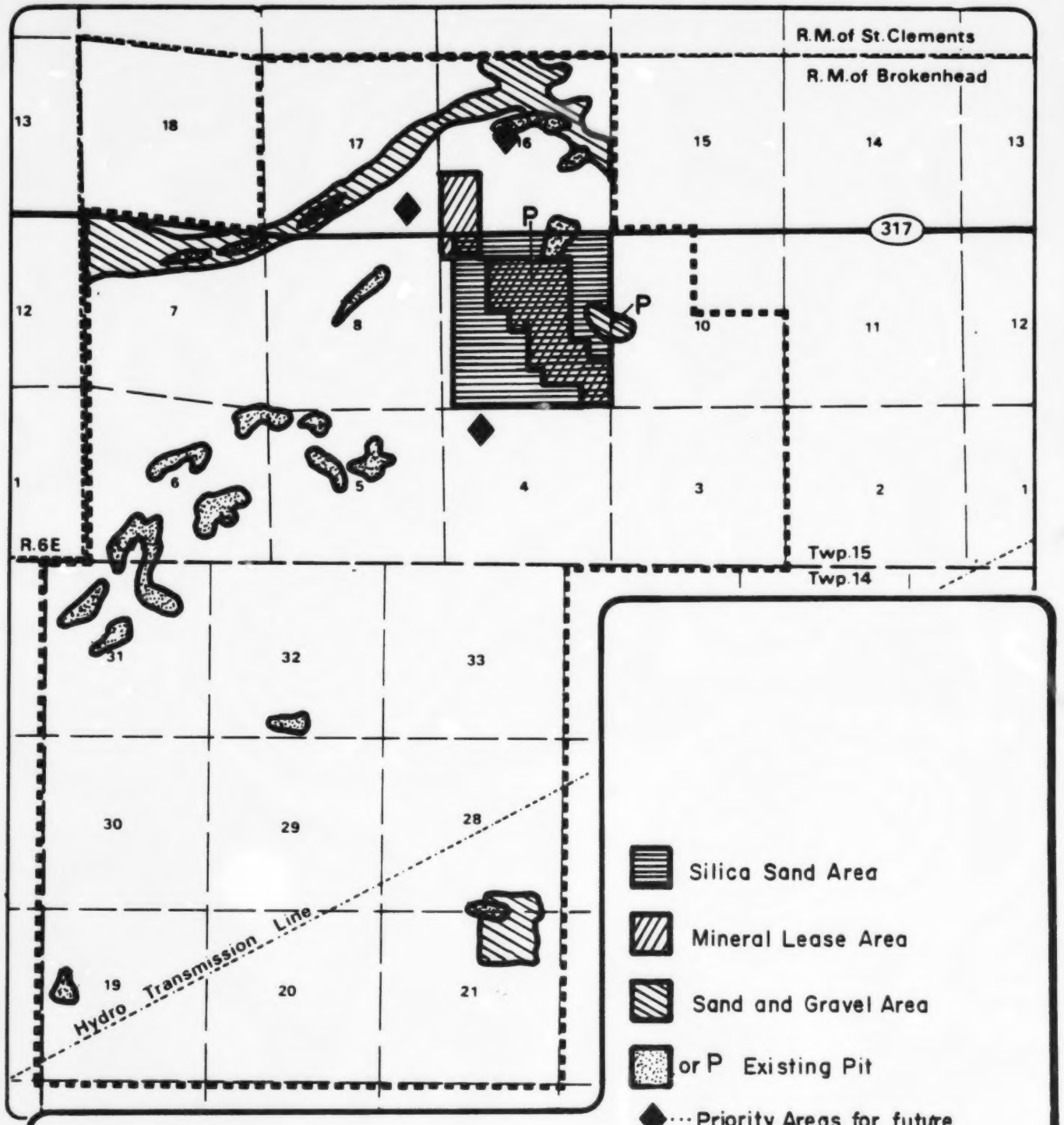


FIGURE 19.
MINERAL RESOURCES; MARS HILL.

SOCIO-ECONOMIC BENEFITS

Social and economic benefits can be achieved in Mars Hill when commercial aggregate removal operations occur. Periodic employment will be created when the removal of aggregate is undertaken. In most cases local people are not employed for these types of operations. Local employment may only occur when long-term projects are planned, especially when there is a need for some local equipment rentals. More realistic activity includes the sporadic demands for aggregate by the local farmers and townspeople. Such uses include driveway base material, fill material, and mixing materials. Presently, the demand for surficial aggregate material is not high. Some future employment activity may include the rehabilitation of depleted gravel pits. The benefits of rehabilitation will be to the wildlife and ultimately therefore to the wildlife interest groups, recreationalists, and the general public. Preliminary discussions concerning rehabilitating depleted gravel pits have occurred.

WATER RESOURCES

SURFACE WATER AND GROUNDWATER RESOURCES

Very few areas in Mars Hill have the capacity to hold surface water from precipitation. In some cases ponds have had to be dug and lined them with clay to hold water in support of wildlife. Even most of the drains adjacent to the municipal roads running through Mars Hill do not contain run-off water for long. Only one area, located in the northwestern portion of the study area, exhibits a source of water. This site is a peat bog complex on top of lacustrine sediments that remains wet due to its water retention capabilities and groundwater flow from the adjacent uplands.

Due to the nature of topsoils and subsurface regolith both the surface water and groundwater resources appear intermittent and for the most part unreliable in terms of supporting agricultural and intensive rural and recreational activities. There is a another concern as a large portion of the Mars Hill is a potential groundwater pollution hazard area (Figure 20). Pollutants could easily leach through the topsoils and subsurface materials to the groundwater zone if proper siting and controls are not required. Care must be taken to prevent any land use developments that would degrade the vulnerable groundwater resource of Mars Hill.

SOCIO-ECONOMIC CONCERNS

Intensive developments of any type for Mars Hill could be influenced by the availability of water. Agricultural operations such as cropping become impractical because of the lack of soil moisture. Livestock operations as well would lack a permanent water supply unless expensive drilling and storage of water occurred. Intensive recreational, rural residential, and urban uses need to be concerned with the precarious situation concerning the surface and groundwater resources of Mars Hill.

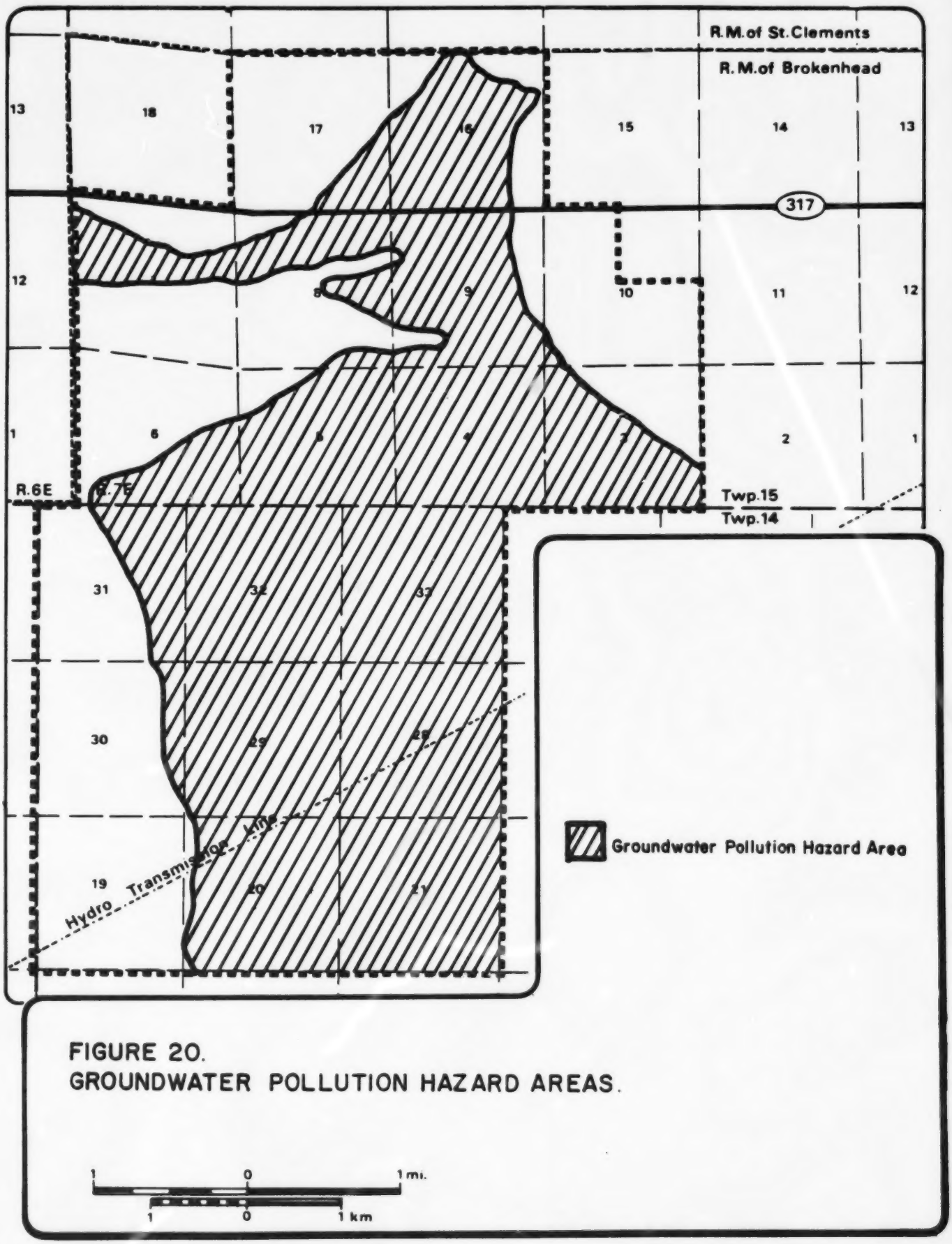


FIGURE 20.
GROUNDWATER POLLUTION HAZARD AREAS.

SPECIAL RESOURCES

ECOLOGICAL RESERVE SITES

In the mid 1970s, the Libau Bog area was identified as a sensitive environmental area (Figure 21). The site is a black spruce, tamarack, and meadow bog ecosystem. It is a low-lying wet bog located off the terrace, on top of lacustrine clay. The bog area is habitat for moose and other wildlife species. In 1987, some species of rare wild orchids were identified on the eastern side of the bog. It is for this reason that portions of section 7 and 8 in Township 15, Range 7 East are being considered as an Ecological Reserve under the authority of the Ecological Reserve Act of Manitoba.

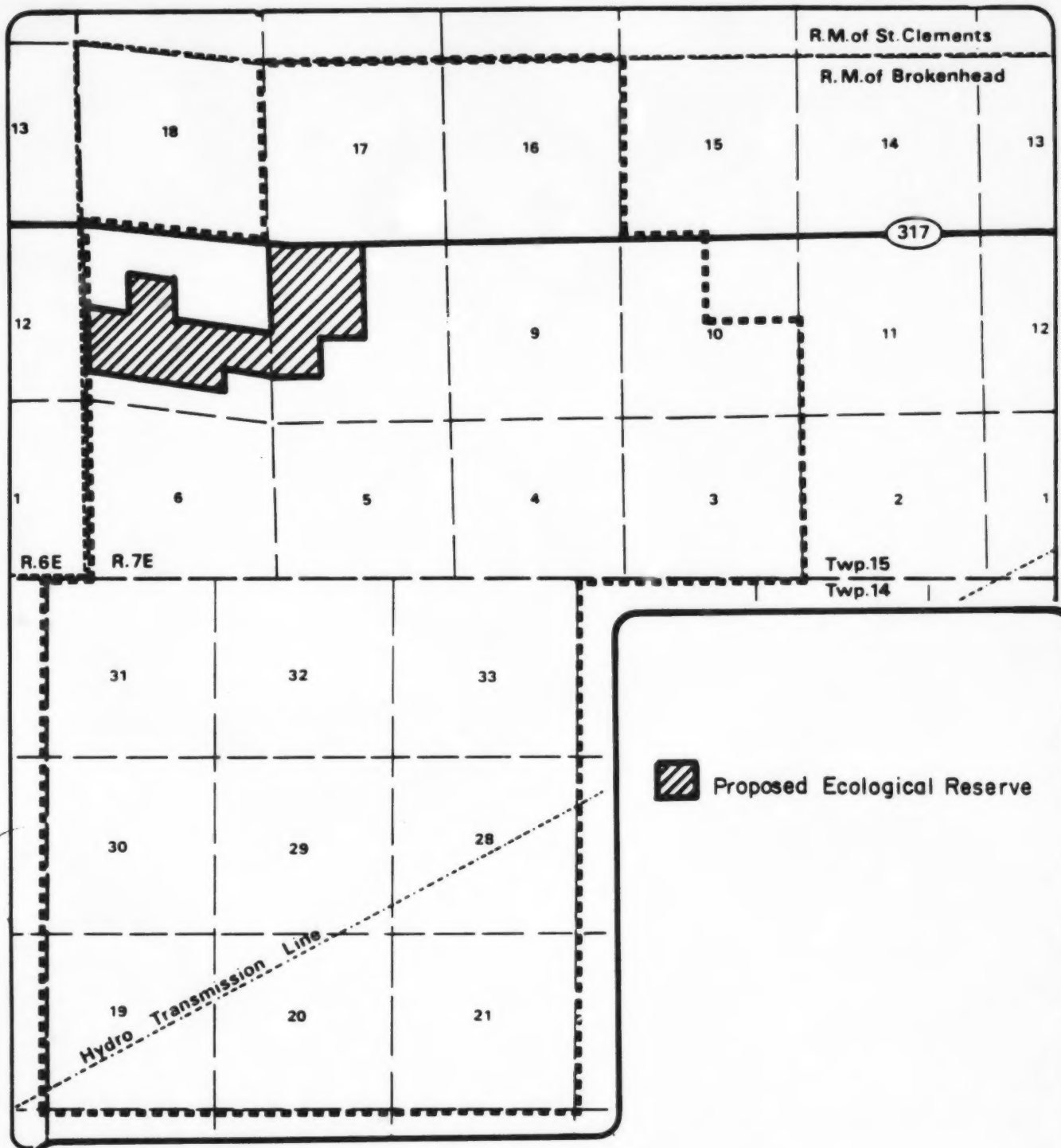


FIGURE 21.
LOCATION OF A PROPOSED ECOLOGICAL RESERVE; MARS HILL.

V. Land Use/Resource Use Recommendations

INTRODUCTION

Some land and resource use recommendations can be formulated for the Mars Hill area. In developing these recommendations, however, it is recognized that some of the most important characteristics of Mars Hill relate to the area's natural state, wildlife resources, aggregate resource, ecological site, and its popularity as an extensively used recreational area. These features are basic and central to the final recommendation for land use.

In developing land and resource use recommendations for Mars Hill the following basic goals and objectives are suggested;

1) The area's naturalness must be acknowledged and safeguarded.

2) The area's wildlife resources are of significant importance and must have the proper recognition in order to promote and protect them.

3) The areas of fragile and unique ecosystems must be properly recognized and protected.

4) The area's recreational potential as an outdoor, extensively used area must be planned and utilized in a manner that is compatible with its natural setting.

5) Other uses (ie. mineral site investigations and extractions) should not occur in isolation of the final land use proposal but in consultation with it and in a jointly managed framework.

AGRICULTURE

Based on the poor performance of agriculture in past years, the low capability of the land to support cropping or livestock, and the present economic instability of the agricultural sector, agricultural development is not proposed for the Mars Hill area. The Mars Hill area is not suited for agricultural development.

FORESTRY

At the present time no major forestry uses are scheduled for the Mars Hill area. However it is recognized that there may be a demand in the future for specific timber resources. The following is recommended:

1) That particular areas in Mars Hill be considered for designated post, pole, and firewood cutting areas open to the public.

2) A fire management plan be prepared for the Mars Hill area. The Mars Hill area should be placed in the "Wooded District" designation and be eligible for provincial forest fire protection services.

3) Limited forestry operations should occur where diseased and fire hazard timber are located. Forestry staff should evaluate and recommend whatever actions are necessary and operate specific salvage operations when required.

4) A provincial forest designation is not recommended. Timber harvesting that may occur should be governed by a joint resource use utilization strategy that is compatible with the designated use of the area.

WILDLIFE

Mars Hill is a very important wildlife area and require provincial recognition. Recommendations regarding wildlife interests are as follows:

1) The area of Mars Hill (excluding the Ecological Reserve proposal) should be considered for wildlife purposes and be coded for and designated as a Wildlife Management Area.

2) A Wildlife Management Area working plan that would consider compatible uses such as outdoor recreation, limited forestry operations, and a fire management strategy should be prepared.

3) A wildlife-outdoor recreation strategy should be prepared.

4) The rehabilitation of depleted aggregate removal pits should be pursued.

5) A study concerning potential ungulate and bear depredation problems on adjacent farmlands surrounding the Mars Hill should be undertaken.

RECREATION

Recreational activity is an important component of any future use of Mars Hill. The area is recognized as valuable for extensive types of recreational activities. Any final designation for the Mars Hill must consider the recreational potential of the area. Some recommendations regarding a recreational use are as follows:

1) Limited peripheral development in suitable areas i.e. parking lots, warm-up shelters, etc. while leaving the interior area in its natural state is recommended.

2) Specific trail systems for all terrain vehicles and snowmobile users should be designated along with walking trails. Recreational access should not be developed in significant ecological areas or critical wildlife habitat production area.

3) Specific sites should be identified for recreational vehicles and shelter facilities. Cottaging, club houses, etc., are not recommended for the Mars Hill area.

MINING

All future uses for the Mars Hill area must consider this mineral potential. Recommendations reflecting the mineral potential of Mars Hill are as follows:

1) The areas of mineral potential lands must be recognized and classified for mineral extraction.

2) The planning and implementing of rehabilitation plans for depleted aggregate sites is recommended.

WATER RESOURCES

No recommendations concerning the water resources of Mars Hill are proposed. However, future developments must consider the impact of development in the groundwater pollution hazard area. Similarly the Brokenhead River Planning District must review any intensive recreational developments or even rural residential developments in the Mars Hill area to ensure that the benefits outweigh the costs.

SPECIAL AREAS

Special areas of ecologically significant are found in Mars Hill. To date only one such area is being considered as a candidate site for ecological reserve status. The following is recommended:

1) Those portions of Section 7 and 8 in Township 15, Range 7E be designated as an Ecological Reserve.

2) If and when other sites are identified as ecologically significant, they should be coded and designated for that use.

INTEGRATED LAND USE AND DEVELOPMENT OPTIONS

Integrated land use designations and development options are suggested to implement the full range of recommendations present. An operational Crown land use plan should be prepared to implement these recommendations and the Provincial Crown land plan for Brokenhead should be amended in accordance with the operation plan.

SUMMARY OF MAJOR RECOMMENDATIONS

1. A Wildlife Management Area is recommended for the Mars Hill.

2. The special resource areas (ecological sites) should be designated as an Ecological Reserve.

3. A detailed Crown land operation plan be prepared to administer and manage the recreational and resource use activities occurring in the Mars Hill.

4. Upon approval of the operational plan, the Crown Land Classification Committee should prepare and process a formal amendment to the Crown Land Use Classification Plan for the Brokenhead River Planning District recommending the establishment of the area as a Wildlife Management Area subject to management of the area as per the operational Plan.

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Appendices

APPENDIX 1. ALTERNATE LAND USE PROGRAM

JUSTIFICATION:

1. Under the terms of reference of the Alternate Land Use Program, land meeting, the following criteria have been used in identifying the property for acquisition by the Province of Manitoba:

   a) low agricultural capability.

   b) lands suitable for an alternate use such as recreation, wildlife or conservation preserve.

   c) land must have an average value of less than $100. per acre. Average cost of subject property is $80 per acre.

2. The subject property is adjacent to a large block of Crown land which has been recommended by the Crown Land Classification Committee for designation as a special project area (wildlife-recreation emphasis). The combined area of the existing Crown land and the subject property is approximately 10,800 acres.

3. The subject property includes an IBP site and acquisition will preserve this biologically unique area.

4. Several requests have been received by the Resource Programs section of the Crown Lands Branch for use of Crown land for a variety of extensive recreation purposes including trails for snowmobiling, cross-country skiing, horseback riding, dog sled training and nature interpretation from the Museum of Man and Nature. Mars Hill, because of its size, proximity to Winnipeg (45 miles) and diverse habitat types, is ideal for these extensive recreation pursuits.

5. Although the area presently has relatively low wildlife populations, with proper management it is likely that upland game bird and deer populations can be increased.

6. Portions of the subject property may be suited for development which might satisfy part of the demand for remote cottaging. This use would complement the proposed extensive recreation trail development. Funds are available in the Alternate Land Use Program for the initial phases of the development of the project, which would include garbage removal, boundary line clearing, trail location and improvement, fence removal and signing. These activities would generate a minimum of 170 man days of work (summer student) from the surrounding district.

APPENDIX 2. RURAL AND AGRICULTURAL DESIGNATION (MUNICIPAL)

PART I - LAND USE POLICIES AND LAND USE DESIGNATIONS

2.0 RURAL AND AGRICULTURAL LAND USE

2.1 CONCERNS

Where rural residential development and land fragmentation has occurred, the trend to larger farms may be restricted due to higher land costs and the difficulty of obtaining large viable parcels. There may also be conflicts occurring between agricultural and non-agricultural uses. The older farmer age and smaller farm size in the R.M. of Brokenhead, compared to the provincial average, is a factor which may promote subdivision of land as there is less of an incentive to invest in farm expansion.

2.2 OBJECTIVES

2.2.1 To protect the present and future agricultural industry in the Planning District.

2.2.2 To foster growth and development of the agricultural industry in the Planning District.

2.2.3 To protect prime agricultural land for agricultural uses; to protect lower class land which is used or has potential for different types of mixed farming enterprises, including livestock and poultry production operations.

2.2.4 To ensure flexibility for farm operators to engage in differing types and sizes of farming operations.

2.2.5 To encourage the efficient use of the land resource in areas which are in a stage of planned transition from rural to urban.

2.2.6 To recognize areas where, because of encroachment and fragmentation of land by residential and other uses, full agricultural development may be limited.

2.2.7 To prevent incompatible land uses from intermixing.

2.2.8 To insure that the necessary supportive services such as bulk fertilizer sales are encouraged to locate in areas which are advantageous to all District residents.

2.3 POLICIES - RURAL AND AGRICULTURAL LAND USE

2.3.1. Areas shall be preserved for a full range of farming activities where:

a) farming is in the dominant position on Class 1, 2 and 3 land according to the Canada Land Inventory, * and where

b) farming is the dominant activity on Class 3/4, 4, 5 and 6 land according to the Canada Land Inventory and where it is desirable and feasible to provide protection to such activities, particularly where there exists a potential for expanded agricultural activities.

2.3.2 Generally, land divisions that create parcels of land less than 80 acres shall not be allowed in areas identified in Section 2.3.1 above. Certain permitted agricultural activities may require a site area less than 80 acres. The site area requirements for such agricultural activities may be determined by the respective Municipal Council and stated in its Zoning By-Law.

2.3.3 Consolidation of small holdings with larger sized holdings shall be encouraged in accordance with the objective of this Section. In such cases the District Board may consider creating small parcels on the condition that larger residual holdings be consolidated. In such instances there should be no increase in the number of titles.

2.3.4 Areas shall be preserved for limited agricultural use on Class 1, 2 and 3 land according to the Canada Land Inventory where, because of the mixture of the land uses, the fragmentation of land holdings or the proximity to established communities, a full range of farming activities may no longer be desirable.

2.3.5 Areas shall be considered for preservation for limited agricultural use on Class 3/44, 5 and 6 land according to the Canada Land Inventory where, because of the mixture of the land use, the fragmentation of land holdings or the proximity to established communities, a full range of farming activities may no longer be desirable.

2.3.6 In all cases where land is being considered for limited agricultural use, as opposed to rural residential development, the emphasis shall be on the preservation of the land in its existing use at the time of adoption of this Policy.

2.3.7 The retention of tree cover and woodlots shall be encouraged as a means of maintaining the natural appeal of the countryside. Major land clearing projects shall be regulated by the R.M. of Brokenhead Zoning By-law.

2.3.8 Land drainage projects shall be regulated by the R.M. of Brokenhead Zoning By-law in order to ensure that municipal drainage systems and other land are not adversely affected.

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* Soil Capability for Agriculture maps, Canada Land Inventory

2.3.9 Removal of topsoil, peat and other surface material shall be regulated in the R.M. of Brokenhead Zoning By-Law in order to prevent destruction of the agricultural land base. A recommendation may be requested from the Department of Agriculture prior to issuance of a development permit. It should be noted that this policy is not intended to restrict excavation for purposes of drainage ditches, dykes, dugouts, road construction, building excavations or similar work.

2.3.10 The re-establishment of tree cover shall be encouraged through public works, private initiative and cooperation programs between private owners and government.

2.3.11 Subdivisions for residential purposes are generally not permitted within areas designated Rural and Agricultural; however, such subdivisions may be permitted where the dwelling is accessory and supportive to the farming operation such as the following:

a) Where children of owner(s) are employed full time in the farming operation,

b) Where a farm is incorporated and it is necessary to establish a residential site separate from the company holdings, and

c) Where a separate residential site is required for a partner(s) working full time in the farming operation.

Residential subdivision may also be permitted in the following circumstances:

a) Where, due to farm consolidation, the dwelling on the farm being acquired or sold is not required as part of the consolidated farming operation, and

b) Where a retiring farmer wishes to retain his homesite and sell the farmland.

2.3.12 Subdivisions for non-farm family use may be permitted in areas having low class agricultural capability subject to the following:

a) The proposed site shall be located on lands having a Canada Land Inventory Rating of Class 4 or poorer, or where the Department of Agriculture has advised that there is little agricultural value.

b) The proposed residential use shall not conflict with any adjacent or nearby agricultural operations.

c) The proposed site shall not be for speculative purposes, but developed and occupied for the family purpose indicated within a reasonable period of time as determined by Council at the time of approval.

2.3.13 Sites created under the provisions of subsection 2.3.11 and 2.3.12 shall be located in a manner that least interferes with the farming operation and shall:

a) Be physically suited for residential purposes;

b) Have frontage on an all weather public road;

c) Be of sufficient size to accommodate the intended use, accessory buildings and the type of waste disposal system intended; and

d) Not be wasteful of agricultural lands. In the case of good agricultural lands the site should not exceed 2 acres in area and in the case of non-agricultural lands, sites should be a maximum of 10 acres. These acreages are intended as guidelines and may be modified to take into consideration the location of existing buildings and shelterbelts, etc.

2.4 RURAL AND AGRICULTURAL LAND USE DESIGNATIONS

Lands for rural and agricultural use are depicted on the Development Plan Maps attached as appendixes hereto.

2.5 ZONING

Rural and Agricultural lands shall be zoned in a subsequent zoning by-law in a manner to permit the broadest range of agricultural activities. Certain large "feedlot" type operations may be regulated to avoid conflict with existing non-farm uses.

With the exception of certain horticultural or market gardening type activities, the minimum acreage allowed shall be restricted to parcels of sufficient area to carry out the type of agricultural activity normally practices in the area.

The zoning by-law will also contain provisions to prevent development from occurring on viable aggregate and mineral deposits.

The zoning by-law may contain provisions to permit the location of certain non-agricultural uses such as golf course, campsites and outdoor recreation areas that will not conflict with agricultural uses.

APPENDIX 3. CROWN LAND CLASSIFICATION POLICIES AND GUIDELINES: MARS HILL

C. Outdoor Recreation - Classification R - As Shown on The Crown Land Use Classification Plan - Map 1

PRESENT CONDITION:

There are two specific sites which have been classified for outdoor recreation, a parcel of Crown land commonly referred to as Sherwood Forest Park and a fairly contiguous block of Crown land in the northwest corner of the municipality often referred to as Marsh Hill or Beausejour or Brokenhead Sandhills. In addition to the two areas identified, all Crown land shorelines and backshores identified as C.L.I. Classes 1-3 are also classified for outdoor recreation. These areas are not however identified on the map as they are often too small in size to be illustrated.

Sherwood Forest Park consists of one parcel of Crown land approximately 17 hectares (42 acres) in size. This area has a history of outdoor recreation use and is presently being used for recreation activities. At the present time, a review of the Sherwood Forest Park is being undertaken. Ultimate recreational use and users will be decided in the future.

Mars Hill - Beausejour/Brokenhead Sandhills encompasses approximately 3,560 hectares (8,800 acres) of Crown land. Pine Ridge loam and Sandilands-Woodridge soils characterize the area and combined with low moisture capacity result in vegetation limitations and considerable ecological fragility. Wooded cover consists of jack pine on dry sites to white spruce and popular on moister soils. The area is featured for its deer wintering areas, sandhill crane nesting sites, sharp-tailed grouse dancing grounds and International Biological Program site of ladyslippers. Furbearers such as weasel, mink, beaver, coyote, lynx and fox may also be found in the area.

Interest in the areas has spanned the last decade. In the mid-seventies a specific program was outlined and the area was consolidated into a block. This was achieved through a major acquisition program whereby approximately 2,023 hectares (5,000 acres) representing 38 parcels of land, was purchased by the Province from the R.M. of Brokenhead.

Actual, proposed and expected use of the area has ranged from the extensive to the intensive and from the natural to the highly developed. While most uses identified have been linked to outdoor recreation and the area has been considered for a satellite city, for forest management and harvesting, recreation, there has also been a wide consideration of use including: hiking, cross-country skiing, snowmobiling, berry and mushroom picking, picnicking, horseback riding, dog sled training, primitive camping, remote cottaging, hunting and in related activities for nature interpretation and as an outdoor scientific education center.

Consideration and study of the area over the past decade has underscored the unique characteristic of this area. While generally considered to be of low capability for all uses, the area's proximity to Winnipeg, its relatively natural state along with its unencumbered status, its potential diversity of uses in

outdoor recreation, its management potential for natural resource use and its fragility has identified the area for special consideration, management and protection.

CONCERNS/OBJECTIVES:

To protect existing recreational facilities and investments and to recognize the historical use of recreation areas.

To safeguard and enhance the utility of fragile areas with recreational potential and to protect those areas such that the recreational opportunities afforded by the areas are assured for future generations.

To recognize the importance of waterways,m waterbodies and shorelands to the public and to protect the integrity and usefulness of these finite resources.

POLICIES/GUIDELINES:

3. Outdoor Recreation - R

To protect, minimize and eliminate degradation of recreational lands, to enhance and preserve both local and provincial recreational opportunity and benefits and to recognize areas which deserve special consideration, management and protection for recreational and natural resource use and conservation, the following apply:

3a. Administration and management of the delineated areas are the responsibility of the Department of Natural Resources.

3b. For the Sherwood Forest Park, no additional development or agricultural use will be allowed, except in those cases where the development is related to or enhances the recreational opportunities afforded by the site.

3c. For Mars Hill-Beausejour/Brokenhead Sandhills, no agricultural use will be allowed. In general, this area is to remain as it occurs in nature.

3c-i) It is recognized that the R.M. of Brokenhead maintains its right to remove gravel in Sections 28, 31, 32, 33 in Township 14, Range 7E also in Section 16 in Township 15, Range 7E to year 2026. Access to these lands will be by the shortest route possible as determined by the Province. The associated routing costs are the responsibility of the Municipality, as agreed in the acquisition agreement between the Municipality and the Province.

3c-ii) No intensive recreational development or resource development will be allowed until a specific recreation-resource plan is prepared and approved. When future demand for recreation and/or resource use in the District and the Province as a whole require expanded use of the area, the Department of Natural Resources will prepare a recreation-natural resource plan for review and approval through the existing procedure.

3c-iii) Wildlife habitat and forestry enhancement, harvesting and reforestation and improvement may be allowed, if considered appropriate and consistent with natural setting of the area and its general recreational use. Establishment of trails or improvement of trails may be allowed providing the general character of the area is maintained.

3c-iv) Other non-consumptive uses may be allowed if considered appropriate by the Department of Natural Resources.

D. Mineral Extraction - Classification M - As Shown on The Crown Land Classification Plan - Map 1

PRESENT CONDITION:

There are approximately 170 hectares (420 acres) of Crown land where aggregate extraction (silica sand) is occurring. This area has been identified and classified for such use. Included in this designation are associated general purpose sites related to the extraction process. All sites are presently in the Mars Hill.

CONCERNS/OBJECTIVES:

To protect existing and future extraction areas and their related support sites.

POLICIES/GUIDELINES:

4. Mineral Extraction - M

The following shall apply:

4a. Other uses will be restricted pending depletion of the deposits.

4b. When the extraction activities are complete, the specific sites shall be re-classified for outdoor recreation, consistent with the surrounding area.

VI. OTHER CONSIDERATIONS

The Crown land plan identified the major classifications for Crown land. There are and will be other site specific uses which are not indicated in the Plan. Recognition of this fact is important at some specific locations for example, residences, may not be indicated but are nonetheless protected by the very nature of the legal commitment to individuals through the leasing and permitting process of Crown lands.

All site specific uses, that is, most land uses occurring on Crown land utilizing less than 40 acres which are not shown in the plan are listed in Appendix 1.

Additionally, there is the consideration of changes in ownership. From time to time there may be changes in the ownership of Crown land. It is evident that such changes will have an impact on any development scheme or plan. While existing consultative procedures ensure conformance with development plans, appropriate review and consideration of the Crown land Classification if important if not essential.